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Sustainable mountain development*

Report of the Secretary-General

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* The present report was prepared by the Food and Agriculture Organization of the United Nations as task manager for chapter 13 of Agenda 21, with contributions from other United Nations agencies and international organizations. The report is a brief factual overview, which intends to inform the Commission on Sustainable Development on key developments in the subject area.

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Introduction

1. Over the past 10 years, mountains have been the focus of growing attention, largely as a result of the recognition they have received under Agenda 21[1] and efforts to implement chapter 13 thereof, entitled "Managing fragile ecosystems: sustainable mountain development". During this period, significant results have been achieved in terms of greater awareness and understanding of the global importance of mountain ecosystems and the people who inhabit them, and through concerted and sustained action in many mountain regions throughout the world to address human development and environmental concerns. Mountains have gained increasing recognition for their global importance as water towers for an increasing world population; focal points of global biological diversity; special places for high cultural diversity; recreation areas for an increasingly urbanized world; and the most sensitive indicators of global environmental and climatic change.

2. However, overall, the level of economic development in most of the world's mountain regions remains unacceptably low. Abject poverty, isolation, cultural erosion, armed conflict, natural disasters and many other threats and obstacles continue to afflict a large number of those living in these fragile ecosystems, in which living conditions are often harsh and difficult. In more developed regions, inappropriate developments in mining, outdoor recreation, transport infrastructure, and suburbanization and air pollution damage have seriously negatively impacted water, flora, fauna and mountain residents. On the other hand, real opportunities exist to improve livelihoods and environmental conditions, and these need to be more fully exploited. The objectives defined under chapter 13 require more concerted and sustained action in the immediate years ahead for real and lasting progress to be achieved.

3. The present report describes major areas of progress achieved in mountain development and conservation, considers major gaps in, and constraints on, progress, and identifies areas on which greater attention needs to be focused in the future. It is not intended to be a comprehensive overview but covers only selected areas that are considered the most important or illustrative of the chapter 13 experience to date.

4. Efforts to implement chapter 13 since 1992 have been carried out at different levels and through a variety of mechanisms and institutional settings. Many events and activities have occurred at the global and regional levels, but more importantly, there has been an increase in action initiated within mountainous countries and local communities throughout the world. Governments, at national and increasingly at decentralized levels, have become more engaged in mountain issues. Non-governmental organizations have played a leading role in these efforts, ranging from awareness-raising activities to local development initiatives. The growing number of activities in support of the sustainable development of mountain regions, although still largely inadequate, indicates that mountain issues are moving from discussion and debate to concrete action on the ground.

5. Mountain issues fall into several programme areas, all of which have seen various degrees of progress. The major areas include: rural development and food security; conservation of biological diversity; fresh water; forests; tourism; climate change; disaster reduction; culture and traditional knowledge; and research. Progress in all these groups has been reported on in some detail in past reports of the Secretary-General to the Commission on Sustainable Development and will not be described in further detail here.

I. Achievements

6. In assessing progress achieved in the implementation of chapter 13, it is useful to recall the major areas that were originally identified at the United Nations Conference on Environment and Development in 1992 as crucial to achieving sustainable mountain development. These include: (a) supporting the efforts of mountain inhabitants to reverse the trend of degradation; (b) creating global awareness on the importance of mountains and building effective mountain constituencies on all continents; and (c) building networks of national, regional and international institutions dealing with the issue of sustainable mountain development. Ten years later, these areas can serve as an important basis for examining the progress that has been made. Relatively little progress has been made in the first area compared with the latter two, for which some of the main achievements are described below.

A. Creating global awareness

7. Raising awareness and understanding about the role mountains play in the global environment and the importance of the goods and services provided by those who live there is an ongoing process, but one in which significant progress has been made. The decision by Governments to assign chapter status to mountains at the United Nations Conference on Environment and Development was itself an important step in raising the profile and visibility of mountains and the issues surrounding them, to a higher level of public debate. The series of consultations of intergovernmental and non-governmental organizations organized under chapter 13 between 1994 and 1996[2] contributed to enhanced political attention to mountain issues, especially at regional and country levels. The strong mountain constituency and prioritized action agenda which have developed since the United Nations Conference on Environment and Development have led to an unusual degree of coordination of efforts and a high level of agreement and effectiveness.

8. Clearly, the most significant opportunity to increase awareness and understanding on mountains has been brought about by the General Assembly's decision in 1998 to declare 2002 the International Year of Mountains.[3] The observance of the International Year of Mountains during the current implementation period of chapter 13 has given new impetus to mountain initiatives and provided greater opportunities for improvements in policies, financial mechanisms, institutional arrangements and other areas affecting mountains. The report of the Secretary-General (A/55/218) on the status of preparations for the Year was submitted to the Assembly at its fifty-fifth session; the Assembly adopted resolution 55/189 on 20 December 2000, calling for, inter alia, renewed support and contributions to make the Year a success.

9. Many countries have mobilized and launched national programmes for Year observance, especially through the establishment of national committees which often involve close partnership and collaboration among Governments, non-governmental organizations, private sector organizations and others.[4] For further information on the Year, the Food and Agriculture Organization of the United Nations (FAO) has established a web site at *www.mountains2002.org*. The most important practical outcome expected from the observance of the Year is the establishment of long-term national mountain strategies and integrated mountain programmes in many countries throughout the world.

B. Building networks

10. The development of new information and exchange networks dedicated to mountain issues has also contributed very significantly to awareness, understanding and strengthened capacity to implement sustainable mountain development. The Mountain Forum, which was established in 1995, has, more than any other single mechanism, promoted greater awareness of critical mountain issues and fostered mutual support for action at the local level. It has done so by providing a variety of services, including electronic conferences, discussion lists, an online library and documentation centre, membership contact information and an updated calendar of key mountain-related events. The Mountain Forum has also played an important role in supporting the observance of the International Year of Mountains. Other mountain networks, regional and thematic, have also grown during this period and contributed to chapter 13 implementation. Among these include the global network of Mountain Protected Area managers and researchers (from 67 countries), under the aegis of the International Union for Conservation of Nature and Natural Resources-World Conservation Union (IUCN), and the Andean Mountain Association and the African Mountain Association at the regional level.

11. Following the United Nations Conference on Environment and Development, inter-agency collaboration and cooperation under chapter 13 have been particularly strong, in particular through the Inter-agency Group on Mountains. This informal ad hoc group includes participants from both United Nations and other organizations, with FAO serving as the group's coordinator. It has been the main institutional mechanism to advise on the implementation of chapter 13 and has served to forge new and innovative partnerships among non-governmental organizations, intergovernmental organizations and Governments. The group has also played a key role in advising on preparations for the observance of the Year.

C. Gaps and constraints

12. Although notable progress has been made in several areas of chapter 13 implementation, as described above, the number of specific mountain initiatives within countries, and in particular at the local community level, remain insufficient to the task. In terms of establishing and adequately funding field programmes in mountain areas, the overall impact of chapter 13 implementation is likely to fall short of its potential unless a significant and renewed effort is made in addressing:

- **Institutional constraints**, especially at national level, inhibiting the development of comprehensive and integrated approaches to sustainable mountain development. Most development activities in mountain regions continue to be sector-based. Yet, the specific issues and problems affecting mountain areas are often interrelated and complex and require long-term solutions that consider intersectoral linkages and relationships;

- **The lack of mountain-specific information and statistics** to assist planners in better understanding the particular nature of mountain areas. Data collected within individual countries rarely make any distinction between highland and lowland areas: reporting districts commonly contain both. This tends to limit the amount of funding going to mountain areas, since there is little statistical evidence of the fact that mountains are relatively worse off in terms of poverty, food security, income opportunities, infrastructure development and so forth, which would more easily justify higher levels of investment. Even where disaggregated data do exist, they are rarely analysed in terms of the geographical distribution of poverty and vulnerable groups. A related gap is in the development of mountain-specific criteria and indicators, potentially an important tool for monitoring progress and assessing the impact of different processes and influences (population dynamics, resource management, poverty and so forth) on the sustainable development of mountain regions;

- **The level of investment in the sustainable development of mountain areas** which has been inadequate over the past 10 years, in terms both of domestic public spending and of official development assistance (ODA). Funding that has gone to mountain areas has mostly been effected through more traditional approaches that include mountain areas among others in national development initiatives and also tend to approach the problems from a sectoral perspective, as described above. In addition, the problem of inequities between highland and lowland regions persists, with inadequate accounting of the real costs of the goods and services that come from the mountains. There are also growing inequities within mountain regions in both the North and the South owing to increasing urbanization in the mountains. A number of innovative mechanisms to fund mountain conservation and development, such as debt-for-nature swaps and payments for watershed services, have been identified and tested, but have yet to be applied on a widespread basis. Private sector investment in mountain areas, other than for exploitive purposes, has also been extremely limited.

13. Efforts to support mountain inhabitants in reversing the trend of degradation remain the most serious challenge in the implementation of chapter 13, as this would involve translating ideas into concrete actions at national, local and community levels and requires far more commitment in resources than what has been made available. There has been progress in this direction, but the pace and the extent of the actions have been far less than what is needed to meet the challenges effectively and adequately. There are some noteworthy examples such as Mexico which embarked in 1997 on a sustainable mountain programme that involved the participation of all stakeholders, training and capacity-building at all levels, and pilot field activities. China also in 1996 launched a major three-year national demonstration project on integrated mountain development in 114 counties in 30 provinces. There are also ongoing efforts in the Fouta-Djallon region of West Africa for integrated upland development and resources management to protect the water supply which is central for the livelihood of many people in the region. However, there is an urgent need for more action, assistance and cooperation to carry out sustainable mountain development that would bring a meaningful change among mountain people at a community and a household level and this is an area that would require the doubling of everyone's efforts and commitments in the coming decade.

II. Future trends and challenges

A. Economic and livelihood opportunities

14. There is a growing realization, based on practical field experience, that sustainable approaches to mountain development, especially those with a strong focus on conservation objectives, require particular attention to improving economic and livelihood opportunities for mountain dwellers. Most initiatives that address natural resource management and environmental issues without addressing the economic and financial needs of mountain populations have had limited success at best. When, for example, income-generating activities are combined with conservation efforts in upland development projects, there is often a higher degree of interest, motivation and ownership of activities that may otherwise be of little direct interest or perceived benefit to local communities. Greater attention to developing local enterprises and related markets for goods and services in mountain areas are increasingly important elements in comprehensive approaches to sustainable mountain development.

B. Ensuring local participation

15. Another important challenge is to ensure that local perspectives, needs and issues are fairly and effectively included in the planning and formulation of mountain development programmes. The fact that many living in mountain regions are politically disenfranchised, often owing to their remoteness from political centres, indicates that empowerment strategies are required to ensure their involvement and active participation in planning and implementing mountain development programmes. The development of national strategies for mountain areas also requires the inclusion of local perspectives to be effective. It is particularly important to ensure that local population groups enjoy sustainable livelihoods as a means to fulfil their basic needs. A significant number of national mountain strategies and programmes are expected to result from the observance of the International Year of Mountains in 2002.

C. Conflict

16. One of the major obstacles to human development in many mountain regions continues to be conflict and war. Mountain areas are, disproportionately, sites of social conflict, ethnic strife and war, resulting from a combination of very complex issues. These include poverty, ethnic tension, competition for scarce resources, particularly water, and even the geographical isolation of mountain areas, which makes them likely refuges for armed opposition groups. Efforts to carry out conservation and sustainable development initiatives are often stymied by these realities. Conflict resolution will have to be a top priority in the coming years if development and conservation efforts in the world's mountain areas and the ensuring of the basic human rights of mountain populations are to be successful and long-lasting. Trans-border parks for peace offer much promise towards this end.

D. Policy and law

17. So far, few countries have enacted comprehensive national mountain legislation and policies that directly address the special conditions and problems of mountain regions and those who inhabit them. In the coming years, in order to provide enhanced support to ongoing mountain initiatives and foster the development of new ones, new legal and policy frameworks will need to be developed at national and decentralized levels. To be effective, these should, at a minimum, recognize local property rights, apply full-cost pricing for mountain goods and services, offer adequate protection to fragile ecosystems and sacred sites, and protect traditional knowledge through intellectual property rights.

E. Natural hazards and risks

18. In recent years, devastating natural disasters have occurred in many mountain regions throughout the world. Major floods, landslides, avalanches and volcanic eruptions have resulted in significant loss of life and severe hardship, often with serious economic disruptions, especially for poorer countries. Significant challenges lie ahead in terms of increasing knowledge about mountain hazards, and identification and surveillance of at-risk households and communities, and of improving risk management, in particular disaster reduction, and preparedness measures to mitigate the impact of disasters on society.

F. Highland-lowland interactions

19. Mountain areas are open systems, which intensively interact with their surrounding regions. Awareness of the importance and complexity of highland/lowland linkages is significantly increasing. These interactions are multifaceted, involving not only ecological considerations but economic, social and political ones as well. In recent years, important experience has been gained in terms of the ecological dimension of these linkages, but little attention has yet been given to the other aspects. Considerable effort is required to increase the knowledge and experience about these linkages, including looking more closely at such issues as highland-lowland trade, stewardship services by mountain communities and equitable share of benefits from extraction by others. Ultimately, these should lead to more secure rights, and opportunities for mountain dwellers. Better support to watershed management groups at different geographical scales and the formulation of integrated watershed management policies are also needed.

G. Research

20. Generating and strengthening knowledge about the ecology and sustainable development of mountain ecosystems constitute one of the major programme areas for action under chapter 13. Given the high level of complexity in mountains and the interrelatedness of many of the sectors, a better understanding of the various processes and interactions that occur in mountain ecosystems is needed to enhance decision-making regarding resource management and human development concerns. Although greater overall levels of investment in mountain research are needed, opportunities already exist to adapt current research in a variety of sectors to more explicitly address concerns in mountain regions. This could result in significant added value of ongoing research without necessarily requiring large new financial investments.

H. Culture and tradition

21. The great diversity of cultures and traditions is a recognized asset of mountains throughout the world and an important element in shaping the wide variety of mountain landscapes and the goods and services they provide. Preserving cultural identity while supporting economic growth and more modern lifestyles, especially as mountain dwellers come into greater contact with outsiders, presents an important challenge in sustainable mountain development initiatives. Cultural diversity and traditional ways of life also provide opportunities for economic growth, especially through tourism, as they are major reasons for the fact that many people want to visit mountains. However, balanced and prudent approaches are needed in developing the enormous potential offered by tourism in mountain areas to avoid negative impacts in terms of both environment and people.[5]

III. Conclusions

22. Since the United Nations Conference on Environment and Development, significant progress has been made on a number of fronts in the implementation of chapter 13. A balanced approach that addresses both human development needs and environmental concerns has been increasingly applied in many mountain regions of the world, in both the North and the South. There remain important reasons to be concerned about the pace of action and the overall commitment, both political and financial, to sustainable mountain development; but the many areas where effective action has occurred give reason for hope that the continuing challenges to improving livelihoods and environmental conditions in mountains can be met. In particular, the strong and dedicated mountain constituency that has grown through very innovative and collaborative mechanisms has brought together people and institutions from a wide variety of sectors to confront the many issues facing mountain areas. Supporting and reinforcing such collaboration are required to ensure further and sustained actions and commitments.

Notes

[1] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

[2] The most notable include regional intergovernmental consultations, which took place in Asia (1994), Latin America (1995), Europe (1996) and Africa (1996). Additionally, non-governmental organization consultations occurred at the global level (Lima, Peru, 1994) and regionally (Europe, 1996).

[3] See General Assembly resolution 53/24 of 10 November 1998. This effort was initiated by Kyrgyzstan in 1996.

[4] In response to a questionnaire sent to 180 countries by the Director-General of the Food and Agriculture Organization of the United Nations (FAO), as lead agency for the Year, many Governments have provided important information about the status of their mountain areas and efforts to carry out sustainable development activities.

[5] In this connection, it should be noted that the year 2002 has also been declared the International Year of Ecotourism (see General Assembly resolution 53/200).

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Review of progress in forests since the United Nations Conference on Environment and Development*

Report of the Secretary-General

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* The present report was prepared by the Food and Agriculture Organization of the United Nations as task manager for chapter 11 of Agenda 21, with contributions from member organizations of the informal high-level Inter-Agency Task Force on Forests (ITFF), other United Nations agencies and international organizations. The report is a brief factual overview, which intends to inform the Commission on Sustainable Development on key developments in the subject area.

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Introduction

1. Forests were among the most controversial issues negotiated at the United Nations Conference on Environment and Development. Several years of international attention focusing largely on tropical deforestation had created a situation in which developing countries, in particular forest-rich tropical countries, felt that their sovereignty over their natural resources was threatened. This North-South polarization, thus, did not permit agreement beyond the Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests ("Forest Principles")[1] and chapter 11 of Agenda 21,[2] at the time of the Conference.

2. The post-United Nations Conference on Environment and Development process contributed substantially to the current high level of global awareness of issues connected with sustainable forest management. A three-year period of confidence-building after the Conference was followed by the establishment of the Intergovernmental Panel on Forests (IPF) in 1995, then by the Intergovernmental Forum on Forests (IFF) in 1997: both were established under the Commission on Sustainable Development to further deliberate and build consensus in the management, conservation and sustainable development of all types of forests. This five-year ad hoc process culminated in October 2000, when the Economic and Social Council established a new international arrangement on forests, the United Nations Forum on Forests (UNFF), and invited the executive heads of relevant organizations of the United Nations system and heads of other relevant international and regional organizations, institutions and instruments to form a collaborative partnership on forests (Council resolution 2000/35 of 18 October 2000).

3. The United Nations Conference on Environment and Development process contributed substantially to the current high level of global awareness of issues connected with sustainable forest management. IPF and IFF both:

- Were open and inclusive intergovernmental forums in which non-government representatives from environmental organizations, including indigenous people's organizations, and forest industry were able to participate;
- Advanced common understanding of sustainable forest management;
- Promoted North-South partnerships between Governments;
- Contributed to the departure from the traditional focus on sustaining wood supply to considering the management of forests in an integrated and holistic manner;
- Were facilitated through enhanced coordination among United Nations and other forest-related international organizations, in particular the informal, high-level Inter-Agency Task Force on Forests (ITFF).

4. The present report describes the progress made, challenges faced and main trends since the United Nations Conference on Environment and Development in the four programme areas of chapter 11 of Agenda 21.

I. Assessment of achievements and constraints

A. Sustaining multiple roles of forests and institutional strengthening

5. Some of the most significant accomplishments have been in this programme area. The area of managed forests is increasing. Recent figures (Forest Resources Assessment 2000) indicate that 88 per cent of the forests of developed countries are managed under a formal or informal plan. Statistics are not available for all developing countries, but preliminary results show that at least 117 million hectares (or 5.8 per cent of the total forest area) are covered by a formal forest management plan of five or more years.

6. Criteria and indicators for sustainable forest management have been developed and widely adopted, providing a framework for monitoring and reporting on progress and guiding policy and management decisions. Following the pioneering work of the International Tropic Timber Organization (ITTO) before the United Nations Conference on Environment and Development in this area, nine major international criteria and indicators processes have been launched involving nearly 150 countries, and there is a widespread interest in, and support for, the work of the Food and Agriculture Organization of the United

Nations (FAO), ITTO, the Center for International Forestry Research (CIFOR), the International Union of Forestry Research Organizations (IUFRO) and other partners. More recent criteria and indicators have been developed by most processes for use at the local forest management unit level. Further work on criteria and indicators is needed in a number of critical areas including:

- Capacity-building to assist countries in implementing criteria and indicators;
- Further encouragement of countries to participate in any process;
- Common international understanding of key concepts, terms and definitions;
- Further clarification of interrelationships between criteria and indicators and certification;
- Further development of criteria and indicators based on the scientific soundness, technical relevance and economic feasibility of key indicators.

7. National forest programmes broadly encompass the full range of policies, institutions, plans and programmes to manage, utilize, protect and enhance forest resources within a country. The strength of the concept is related to the political commitment generated and the flexibility of the approach, which allows each country to adjust its forest programme to national conditions and development priorities. A survey of 145 countries undertaken by FAO in 1998-1999 showed that 96 per cent of them had national forest programmes in various stages of development but such programmes were being implemented only in 44 per cent of the countries, and many were "stalled" owing to lack of institutional, human resource and financial capacity as well as the absence of adequate policies, poor coordination and deficient mechanisms for public participation.

8. The IPF/IFF process encouraged greater openness to public, or major group, participation both in national and in international forums, enriching the debate and making the resulting outcomes more robust. Also, more countries and regions are involved in the international forest policy deliberations than a decade ago owing to various regional activities, such as criteria and indicators processes, the regional preparatory meetings of the non-governmental organizations-Costa Rica-United Nations Environment Programme (UNEP) initiative on the underlying causes of deforestation and forest degradation (see E/CN.17/IFF/1999/18), the regional consultations of the Costa Rica-Canada initiative on the international arrangements and mechanisms on forests (see E/CN.17/IFF/2000/9), and the regional activities of many other organizations.

9. The implementation of IPF/IFF proposals for action will require countries to continue efforts towards public participation; devolve responsibilities for forest management; improve links between forest policy and ground-level implementation; and incorporate the experience of local forest users and the public in policy formulation.

10. There also remain challenges to the implementation of cross-sectoral coordination and political commitment at the national level towards sustainable forest management policies and practices and the introduction of good governance in relation to forest management.

B. Forest conservation and rehabilitation

11. Forest conservation and rehabilitation, and maintaining forest cover to meet present and future needs, have been overriding principles of the intergovernmental forest policy dialogue during the last decade. In this respect, finding innovative solutions to the loss of forest cover and forest degradation is a major challenge, owing to many fundamental socio-economic factors, such as land ownership and distribution, population growth and poverty, which are beyond the forest sector's influence. Both IPF and IFF emphasized the need for coordinated actions with related chapters of Agenda 21, the Convention on Biological Diversity,[3] the United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa,[4] and the United Nations Framework Convention on Climate Change.[5]

12. Some progress has been made in policies developed to combat the loss of forest cover caused by the conversion of forests to agricultural use and to combat the many causes of forest degradation. Forest fires have been a major cause of forest destruction and degradation in recent years.

13. The area of planted forests has continued to increase. In 2000, the global area of forest plantations was estimated at 186 million hectares, or 4.8 per cent

of the estimated global forest area (4.1 per cent in 1995). Planted forests are increasingly supplying industrial roundwood and fuelwood, providing perhaps 20 per cent of global industrial roundwood. Successful plantation development is highly dependent on a favourable policy and investment climate coupled with sound techniques and stakeholder involvement.

14. Efforts to conserve forest biological diversity have become widespread. The Convention on Biological Diversity provides an international legal framework for the conservation and sustainable use of biological diversity and many countries have prepared national biodiversity action plans. Biodiversity conservation is an important component of bilateral and multilateral assistance and is the focus of concerted efforts by many non-governmental organizations. IFF addressed the topic through special studies and government-sponsored inter-sessional meetings, such as the Brazil-United States of America International Experts Meeting on Protected Forest Areas (1999). It has been estimated by the World Conservation Monitoring Centre within Forest Resources Assessment 2000 that globally the proportion of the world's forests within protected areas has increased from 8 to 11 per cent. While this is a large area, it is still generally not considered to be sufficient. To enhance their conservation value, efforts are being made to increase the area of land in protected area systems and to make more strategic choices about additional areas to protect. Emphasis has been placed on improving the effectiveness of biological diversity conservation within and outside existing protected areas, and managing the two in an integrated way. Managed production forests, incorporating in their objectives the conservation of genetic resources and intraspecific variation in socio-economically important species, are a necessary complement to management for conservation in protected areas.

15. The IPF/IFF process recognized that developing countries with low forest cover and small island developing states have specific needs in sustainable forest management. As a result of the Open-ended International Meeting of Experts on the Special Needs and Requirements of Developing Countries with Low Forest Cover and Unique Types of Forests, hosted by the Islamic Republic of Iran (1999) (see E/CN.17/IFF/2000/7), agreement was reached to launch the Tehran Process to address common issues and raise the low forest cover issues in the international forest policy agenda. Small island developing States, as recognized by Agenda 21, constitute a special case for both environmental protection and development. Particular requirements of small island developing States were examined by the Special Conference at Ministerial Level for Small Island Developing States, organized by FAO in 1999, which proposed a plan of action to promote rehabilitation and conservation of forests and watersheds and ensure sustainable forest management.

C. Utilization, assessment, valuation and research

16. The recent Global Forest Resources Assessment 2000 conducted by FAO has been the most comprehensive assessment in the 50-year history of the Forest Resources Assessment. It included not only the traditional estimates of forest area and deforestation but also many new "sustainability" parameters. Preliminary results from a comparison of remote sensing surveys of forest cover carried out in the 1980s and 1990s show that the rate of deforestation has slowed by 10 per cent in the tropics, particularly the humid tropics, but it is not yet clear if this is statistically significant. The global rate of net forest loss slowed to 9 million hectares yearly, a figure that is 20 per cent lower than the global figure reported in 1995. Forests are disappearing most rapidly in Africa and Latin America, whereas in Asia the reduction of natural forests is largely compensated by new plantation forests. In Europe and North America, the forest area increased.

17. In forest utilization, there have been moves towards more efficient use of raw materials and recycling, particularly in the use of recovered paper: the European paper industry committed its members to increasing the uses of recovered paper from 49 to 57 per cent. Another improvement has been the development of reduced impact logging techniques and codes of harvesting, which are being implemented by the forest industry in some countries of the Asia-Pacific region and elsewhere. The socio-economic contribution of non-wood forest products is better recognized, particularly for major internationally traded products like bamboo, rattan or medicinal plants. More research, in particular on the economics of the entire range of non-wood forest products, is needed.

18. Much of the wood harvested in the world each year is still used for energy production. Of wood harvested in 1995, 63 per cent, or an estimated 7 per cent of the world's total energy supply, was used as wood fuel. In developing countries, however, where fuelwood has been a major source of energy for domestic use, the average share of wood fuels in total energy use remained at 15 per cent. More sustainable sources of supply for meeting fuelwood needs need to be explored.

19. Forest research, traditional forest-related knowledge, monitoring and assessment, and the need for common concepts, terminology and definitions have all been part of the intergovernmental forest agenda since Rio. The Convention on Biological Diversity has included outcomes from the IPF/IFF on traditional forest-related knowledge and indigenous people in its work on implementing article 8 (j) of the Convention and in the implementation of its programme of work for forest biological diversity. There are unresolved issues relating to fair and equitable sharing of benefits arising from plant genetic resources as well as to traditional forest-related knowledge and associated intellectual property rights.

20. Work has continued on forest valuation, mostly in academic institutions and at national rather than international level. Efforts have been made to improve the representation of the forestry sector in national income accounts by organizations such as the World Bank, FAO, the Statistical Office of the European Communities (Eurostat) and the United Nations Statistics Division, as well as national statistical offices. The academic literature on the valuation of non-market costs and benefits of forestry has expanded, but much of this work has had relatively little impact on the day-to-day management of forests or the development of forestry policy. Practical approaches to deal with cost internalization, valuation of forest products and fair and equitable sharing of benefits need to be developed.

21. Continued efforts are needed, particularly by international organizations and conventions. These include:

- Further streamlining and harmonizing of the many reporting formats;
- Further efforts to bring about consensus on sharing of benefits related to traditional forest-related knowledge;
- Funding of forest research; strengthening of capacity-building; fostering of joint research between the public and private sectors; and strengthening of links between forest research and policy-making.

D. Capacity-building, cooperation, technology transfer and trade

22. This programme area, perhaps the most important in the international forest policy agenda, is where there has been least progress. This is partly because the issues extend far beyond the forest sector and the solutions involve Governments and a range of other stakeholders including the private sector.

23. The Uruguay Round of multilateral trade negotiations agreements were seen as important in respect of encouraging sustainable forest management through market incentives, in particular reduction in tariff barriers. The improvements, however, could be overshadowed by export restrictions imposed by developing countries to encourage domestic processing, or by environmental and trade restrictions on products that are perceived as being produced unsustainably.

24. More than 50 international and national schemes for certification of forest management have been developed since the United Nations Conference on Environment and Development, and the interest in certification is growing, both in developed and in developing countries. Efforts are continuing to make the schemes compatible and to develop a concept for their multilateral recognition. An estimate of the area of certified production forests lies between 2.1 and 2.9 per cent of the total forest area.

25. Illegal logging and illegal trade are increasing problems to sustainable forest management. While logging bans can be an effective way of protecting forests in certain cases, the long-term effects need to be studied.

26. The concept of "trade in support of sustainable forest management" may assist in confining the debate on "trade and environment" in the field of forests. There is need to further examine positive and negative implications of trade in forest products and services for sustainable forest management and ways to minimize/eliminate any negative impacts. Trade in forest products is still mainly limited to primary

products that have little value added from processing in developing countries. Therefore, such trade has led to low local appreciation of the benefits of forests, and fewer job opportunities in processing, and may also have contributed to illegal trade. In relation to technology transfer, two initiatives have arisen from decisions of the Commission on Sustainable Development: the clean technology centres and the database providing information on where to obtain funding for technology transfer, which could be fruitfully pursued by the international community. The Kyoto Protocol to the United Nations Framework Convention on Climate Change[6] has the potential to generate investment in forestry in developing countries through carbon sinks and clean development mechanisms, which need further examination and promotion.

27. Debates over financial cooperation have been difficult in all Agenda 21 sectors. The IPF/IFF process was successful in achieving some specific progress by elaborating on distinct roles of private and public, domestic and external sources of funding in financing sustainable forest management activities. Exploration was begun in respect of the feasibility of an investment promotion entity concept to promote financing for sustainable forest management.

II. Final remarks

28. There have been encouraging trends in the field of forests since the United Nations Conference on Environment and Development. Global awareness of sustainable forest management concepts in the public and private sectors has increased and political consensus has been reached on many national and international actions on forests. Forests are viewed in a more holistic manner and decisions on forest policy and management are more participatory and more coordinated. The rate of deforestation in tropical forests, especially moist forests, may be decreasing (although it remains high), wood production is increasingly moving to plantations, forest areas in some temperate countries are increasing, and the area of protected forests is increasing.

29. The challenge is to maintain and accelerate the move from policy dialogue to action. UNFF and the collective partnership on forests need to find ways and means to facilitate the implementation of the IPF/IFF proposals for action, to strengthen political commitment at the national level, and to enhance coordination and cooperation among international organizations, so as to advance common understanding on sustainable forest management and to put it into effect on the ground.

Notes

[1] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex III.

[2] Ibid., annex II.

[3] See United Nations Environment Programme, *Convention on Biological Diversity* (Environmental law and Institution Programme Activity Centre), June 1992.

[4] A/49/84/Add.2, annex, appendix II.

[5] A/AC.237/18 (Part II)/Add.1 and Corr.1, annex I.

[6] FCCC/CP/1997/7/Add.1, decision 1/CP.3, annex.

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Oceans and seas*

Report of the Secretary-General

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* The present report was prepared by the Subcommittee on Oceans and Coastal Areas of the Administrative Committee on Coordination as task manager for chapter 17 of Agenda 21, with contributions from international agencies and organizations. The report is a brief factual overview, which is intended to inform the Commission on Sustainable Development on key developments in the subject area.

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Introduction

1. Chapter 17 of Agenda 21[1] deals with the protection of the oceans, all kinds of seas, and coastal areas and the protection, rational use and development of their living resources. It highlights the special needs of small island developing States, whose fragility and vulnerability require particular attention. Underlying all these concerns is support for strengthening international, including regional, cooperation and coordination.

2. As recognized in chapter 17 of Agenda 21, international law, as reflected in the provisions of the United Nations Convention on the Law of the Sea,[2] sets forth rights and obligations of States and provides the international basis upon which to pursue the protection and sustainable development of the marine and coastal environment and its resources. Building on the Convention, which entered into force in 1994 and has to date been ratified by 135 States parties, as well as Agenda 21, Governments and the United Nations system have successfully negotiated a series of international agreements, principles and standards that are gradually creating a structure for the governance of the oceans. Many of these agreements and legally binding instruments have still not been adopted and/or ratified by member States, and all of them need to be more fully implemented; but it is a measure of the achievement that the international community has been able to agree on such a diverse and complex number of statements, principles and common goals dealing with the oceans.[3]

3. Owing to the sectoral nature of most ocean research, management and governance efforts, the present brief report on achievements and challenges facing the international community is organized according to the major programme areas identified in chapter 17 of Agenda 21.

I. Achievements

A. Integrated management and sustainable development of coastal areas

4. Significant progress has been achieved over the past decade in promoting an integrated approach to coastal management. At the beginning of the 1990s, efforts were limited to relatively few countries, and were concentrated at the local and community levels, especially in isolated regions, while today some level of coastal planning is present and regularly used in the great majority of coastal States, including small island developing States. Institutional development and legal codification of these new practices at the level of the State are also increasing.

5. National as well as regional programmes have been assisted by the various guidelines, principles, standards and networks on integrated coastal area management (ICAM) that have been developed by the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations University (UNU), the World Bank and other agencies and organizations of the United Nations system. The Intergovernmental Oceanographic Commission (IOC) of UNESCO, with other partners, has created a clearing-house mechanism containing information on ICAM. The World Meteorological Organization (WMO) coordinates a global system to provide comprehensive marine climatological databases for all ocean areas, including coastal zones and exclusive economic zones (EEZs).

6. Coastal wetlands, including estuaries, marshes, mangrove swamps, lagoons, seagrass beds and coral reef systems, play a critical role in protecting coastal and marine ecosystems from storm surges and other weather-related events. In view of their importance, the parties to the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)[4] are developing guidelines for integrating wetlands into coastal area management.

7. The widespread bleaching and destruction of coral reefs in recent years have been linked to a number of factors, both natural and man-made. An estimated 27 per cent of reefs are thought to have been lost owing to both direct human impacts and the effects of climate change events in 1997-1998, and predictions are that a further 32 per cent of the world's coral reefs may be functionally destroyed within the next 30 years unless urgent measures are undertaken.[5] Several international collaborative partnerships have been formed or strengthened to deal with and reverse the threat to reefs, which provide food and livelihoods for millions of people living in coastal areas and support unique and valuable marine biodiversity. These include

the International Coral Reef Initiative (ICRI), the International Coral Reef Action Network (ICRAN) and the Global Coral Reef Monitoring Network (GCRMN).

B. Marine environmental protection

8. Two main conceptual innovations are at the base of many of the important efforts to protect the marine environment undertaken during the decade: the increasing acceptance of the precautionary approach and the introduction of an ecosystem-based approach to management. The precautionary approach, as set forth in principle 15 of the Rio Declaration on Environment and Development,[6] has successfully moved from general guideline to practical use and application (for example, with respect to some regional fisheries management organizations) and has been incorporated into several national laws and international agreements. An ecosystem-based approach is central to the implementation of the Convention on Biological Diversity[7] and also in the elaboration of the Large Marine Ecosystem (LME) projects currently being implemented in 58 countries in Africa, Asia, Latin America and eastern Europe. The Global Environment Facility (GEF) funds marine ecosystem projects totalling about US$ 200 million under its international waters and biodiversity components. Both concepts are increasingly seen as a means of advancing marine environmental protection and sustainable development, although the lack of precise definitions has to some extent limited their application.

9. An important impetus to develop new approaches and methods for preventing the degradation of the marine environment was the adoption in 1995 of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities,[8] known as the GPA. The GPA provides conceptual and practical guidance to national and/or regional authorities. A major goal is the development of a clearing-house mechanism as a referral system to mobilize experience and expertise, and to facilitate scientific, technical and financial cooperation. The establishment by the United Nations Environment Programme (UNEP) of a GPA Coordination Office in The Hague has furthered these objectives, initiating the preparation of nine regional assessments of land-based activities and eight regional programmes of action between 1996 and 1999. The first Intergovernmental Review Meeting on implementation of the GPA will take place in Montreal, Canada, from 26 to 30 November 2001.[9]

10. Cooperation and collaboration among United Nations agencies and organizations are particularly important in furthering the implementation of the GPA, especially in relation to the clearing-house mechanism within which individual organizations have been designated "lead agencies" for specific pollutant source categories. Ongoing activities undertaken in support of this work include the joint inter-agency Marine Pollution Emergency Response Support System to assist countries in setting up monitoring programmes and increase their capacity-building. A number of organizations have expanded training programmes to build up national capacities, particularly in developing countries, in marine environmental monitoring and assessment. These include: the United Nations/UNDP Train-Sea-Coast programme, which operates a network of 17 training centres worldwide; the International Atomic Energy Agency (IAEA) Marine Environment Laboratory (MEL), the only marine laboratory in the United Nations system; and UNU. Many other specific programmes and activities are being undertaken by United Nations agencies and organizations in pursuance of these goals.

C. Sustainable use and conservation of marine living resources

11. Recent estimates by FAO indicate that at least 60 per cent of world fisheries are either fully exploited or overfished. While the proportion of stocks that are overfished is now growing at a slower rate than in the mid-1990s, FAO estimates that the total marine catches from most of the main fishing areas in the Atlantic Ocean and some in the Pacific Ocean may have reached their maximum potential years ago, and substantial total catch increases from those areas are unlikely. The implications of such developments for global food security and income generation for both present and future generations were assessed by the Commission on Sustainable Development when it reviewed oceans and seas at its seventh session. The Commission recommended, inter alia, that particular priority be given to the conservation, integrated and sustainable management and sustainable use of marine living resources, including the ecosystems of which they are a part.[10]

12. A great deal of progress has been achieved in the area of responsible fisheries development and management as a result of the United Nations Convention on the Law of the Sea and the adoption of a number of complementary international instruments and voluntary agreements. The FAO Code of Conduct for Responsible Fisheries of the Food and Agriculture Organization of the United Nations[11] (adopted by the Conference of FAO in 1995) has influenced many countries with respect to modifying their fisheries laws to facilitate its implementation. Also under FAO auspices, three International Plans of Action were adopted in 1999 and are being implemented to: improve shark management; reduce by-catch of seabirds in long-line fisheries; and control and reduce fishing capacity. However, several important international agreements require further ratification or accession to by States to become effective, most notably, the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks[12] (the 1995 Agreement on Fish Stocks), which needs three more ratifications to enter into force, and the 1993 FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas[13] (the Compliance Agreement), which requires six more acceptances.

13. The prevalence of illegal, unregulated and unreported (IUU) fishing, both on the high seas and within EEZs, remains one of the most severe problems affecting world fisheries. The issue was given priority attention by the first meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (New York, 30 May-2 June 2000), which welcomed the work being undertaken by FAO to develop a comprehensive International Plan of Action to prevent, deter and eliminate IUU fishing, in accordance with international law. The new, non-binding International Plan of Action was adopted by the FAO Committee on Fisheries in early 2001.

14. In response to recommendations by the Commission on Sustainable Development and other bodies, several regional fishery bodies have undertaken a systematic review of their operations with a view to improving their effectiveness, and institutional arrangements for new regional fisheries management organizations have been made or are being finalized (for example, in south-west Africa, and in the central and western Pacific). Cooperation between Governments, non-governmental organizations and industry has led to the elaboration of guidelines for sustainable aquaculture, and guidelines have been developed (and are being tested) for indicators of sustainable development in fisheries. Particular efforts are being made to ensure sustainable livelihoods to small-scale fishers and coastal communities. As a contribution to the 10-year review of the United Nations Conference on Environment and Development, the Government of Iceland and FAO are organizing a conference on responsible fisheries in the marine ecosystem, to be held in Reykjavik from 1 to 4 October 2001.

D. Addressing critical uncertainties for the management of the marine environment and climate change

15. The past 10 years have seen a turning point in terms of understanding and measuring the role of the oceans in global climate change. With significant improvements in the ability of computer models and technology to research and monitor climate changes, the collection of previously unavailable information is now being organized and utilized through a concerted inter-agency and intergovernmental effort to continuously monitor the major planetary processes. The International Oceanographic Data and Information Exchange (IODE) programme of UNESCO/IOC comprises a network of national oceanographic data centres in more than 60 countries, and regional ocean data and information networks in Africa, Latin America and the Caribbean and the Western Pacific have been developed and strengthened. The development, by UNESCO/IOC, WMO and the International Council of Scientific Unions (ICSU), of the Global Ocean Observing System (GOOS) provides a capability to predict strong weather events such as El Niño/La Niña. Since 1998, GOOS has been working closely with the Global Terrestrial Observing System (GTOS) and the Global Climate Observing System (GCOS) to form a single Integrated Global Observing Strategy (IGOS), in partnership with national space agencies, for better observation of the atmosphere, oceans and land.

16. A very significant development is the January 2001 release of a major new assessment report by the

Intergovernmental Panel on Climate Change (IPCC), which has found there is new and stronger evidence that most of the global warming observed over the last 50 years is attributable to human activities. IPCC, which brings together over 100 leading scientists from around the world and is jointly sponsored by UNEP and WMO, warns of a potentially devastating global warming over the coming century, with impacts of rising sea levels and changing rain patterns.[14] Floods, drought and extremely high temperatures could threaten the life and livelihoods of millions of people living in low-lying coastal areas. Residents of small island developing States would be most at risk from warmer temperatures and rising sea levels, while the degradation of coastal habitats including coral reefs could accelerate.

17. Gaps still remain, however, in the collection and understanding of scientific data related to the oceans and atmosphere. United Nations system efforts, many carried out in partnership with national agencies as well as the private sector and non-governmental organizations, are addressing the removal of critical uncertainties by pursuing four main lines of action: (a) facilitating, promoting and coordinating appropriate research; (b) developing and implementing appropriate operational observing and forecasting programmes; (c) providing data and information services in support of both research and operations; and (d) working through training, education and mutual assistance to improve the capacity of developing countries.

E. Strengthening international, including regional, cooperation and coordination

18. Chapter 17 of Agenda 21 concluded that there was a need to improve coordination and strengthen links among the numerous national and international, including regional, institutions, both within and outside the United Nations system, with competence in marine issues. The Commission on Sustainable Development addressed the question of strengthening means of cooperation and coordination at its fourth (1996) and seventh (1999) sessions, noting at the latter "that oceans and seas present a special case as regards the need for international coordination and cooperation".[15]

19. The Commission on Sustainable Development in 1999 also urged that, building on existing arrangements, a more integrated approach was required to all legal, economic, social and environmental aspects of oceans and seas, both at intergovernmental and at inter-agency levels. The General Assembly, in its resolution 54/33, endorsed the recommendations made by the Commission on oceans and seas regarding international coordination and cooperation and decided, inter alia, to establish an open-ended informal consultative process to facilitate, in an effective and constructive manner, its annual review of developments in ocean affairs.

20. The new United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea held its first meeting in New York from 30 May to 2 June 2000. It addressed, in particular, issues related to IUU fishing and economic and social impacts of marine pollution and degradation, especially in coastal areas. The report on the work of the consultative process (A/55/274) was considered by the General Assembly at its fifty-fifth session under the agenda item entitled "Oceans and the law of the sea". The Assembly, in its resolution 55/7, requested the Secretary-General to convene the second meeting of the Consultative Process in New York from 7 to 11 May 2001 with the following two areas of focus: marine science and the development and transfer of marine technology as mutually agreed, including capacity-building in that regard; and coordination and cooperation in combating piracy and armed robbery at sea.

21. Considerable expertise has been built up within the United Nations system over the years in ocean matters, mostly based on sectoral and intergovernmental mandates. In recognition of this, the Inter-agency Committee on Sustainable Development of the Administrative Committee on Coordination (ACC) created a new ACC Subcommittee on Oceans and Coastal Areas comprising all relevant United Nations organizations to serve as task manager for chapter 17 of Agenda 21. The Subcommittee also acts as inter-agency facilitating mechanism for the implementation of the GPA (see para. 9 above). It conceived and is developing the United Nations Atlas of the Oceans, a joint effort funded by the United Nations Foundation to present an integrated information system on the sustainable use of ocean resources. The Atlas will be available as a comprehensive, cooperatively maintained web site (based in FAO) as well as a CD-ROM.[16]

22. International cooperation on the oceans has also developed new modes of action and thinking. For

example, the establishment in 1999 by the governing bodies of WMO and UNESCO/IOC of the joint Technical Commission for Oceanography and Marine Meteorology represents a new paradigm in international cooperation, in which two United Nations organizations have agreed to pool resources and expertise to address, on a continuing basis, common challenges. Partnerships that span beyond the United Nations system to incorporate non-governmental organizations, international financial institutions and governmental organizations have also been developed. This increasingly involves public and private sectors in joint programmes and projects.

23. A long-standing example of inter-agency collaboration with the scientific community on technical issues related to the oceans is the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), sponsored by the United Nations, the International Maritime Organization (IMO), FAO, UNESCO/IOC, WMO, the World Health Organization (WHO), IAEA and UNEP. GESAMP provides independent advice, inter alia, on the assessment of potential effects of pollutants; sustainable coastal aquaculture; the development of scientific bases for marine research and monitoring programmes; and the exchange of scientific information. In 2001, two major reports were published: on land-based activities affecting the marine, coastal and associated freshwater environment; and an overall assessment study entitled "A Sea of Troubles: Issues in Focus". In response to the recommendations of the Commission on Sustainable Development, GESAMP is currently undergoing an in-depth and independent evaluation, initiated by its sponsoring agencies, to make this advisory mechanism more effective and responsive, inter alia, to member States.

II. Constraints and challenges

24. The Commission on Sustainable Development, at its seventh session (decision 7/1, para. 1), emphasized "the fundamental fact that oceans and seas constitute the major part of the planet that supports life, drive the hydrological cycle, and provide the vital resources to be used to ensure well-being for present and future generations and economic prosperity, to eradicate poverty, to ensure food security and to conserve marine biological diversity and its intrinsic value for maintaining the conditions that support life on earth". Given such a broad and important range of functions, goals and responsibilities, it is clear that the challenges to be met in reaching these objectives are significant. As a growing understanding of the oceans has led the international community to recognize that the seas and their resources are not limitless, as was once assumed, there is greater appreciation of their importance to global sustainable development.

25. In contrast with the situation on land, where innovative management practices are based on long-established laws and institutions, the mechanisms for the sustainable development and management of the oceans that have been established under the United Nations Convention on the Law of the Sea, and based on international law, are still fairly new and as yet insufficiently tested by time and practical use.[17] Furthermore, if on land the jurisdiction of the State can guarantee compliance with the law through strong enforcement mechanisms, the new institutions governing the oceans face the challenge of having to protect the largest commons on the surface of the planet without such support. These constraints define a special and unique role and responsibility for the international community vis-à-vis the challenge of ocean governance.

26. The proliferation in recent years of international and regional agreements, both legally binding and voluntary, dealing with all aspects of ocean affairs, while contributing to international norm-setting, has made implementation at the national level more and more difficult. New conventions and protocols have been negotiated, but many have not yet come into force. National authorities are also often faced with complex and sometimes contradictory domestic mandates and priorities affecting oceans management and the protection of the marine and coastal environment. A few Governments are addressing this situation by seeking to integrate relevant policies, activities and laws under a unified national oceans strategy.

27. International agreements and legal instruments elaborated since the United Nations Conference on Environment and Development call for integrated approaches to policy formulation and implementation which cut across the traditional sectoral boundaries of national and international institutions. Effective action requires a strong commitment to coordination and collaboration among all partners to bring

implementation up to the level of the expanding international, regional and national normative framework. As called for in Agenda 21 and reaffirmed by the Commission on Sustainable Development, the General Assembly and other bodies, progress in achieving the goals on oceans and seas can best be realized through the collaboration and participation of all relevant partners, including Governments, intergovernmental and international organizations, the scientific community and other major groups, including non-governmental organizations. To further these efforts, a global conference entitled "Oceans and Coasts at Rio+10: Assessing Progress, Addressing Continuing and New Challenges" is being organized by UNESCO/IOC, together with a non-governmental organization/scientific committee, to be held in Paris, 3-7 December 2001. The conference is expected to address all aspects of the post-United Nations Conference on Environment and Development oceans and coasts agenda, provide an overall perspective and assessment, and seek new directions on cross-sectoral issues.

Notes

[1] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

[2] *Official Records of the Third United Nations Conference on the Law of the Sea*, vol. XVII (United Nations publication, Sales No. E.84.V.3), document A/CONF.62/122.

[3] For a comprehensive discussion of the United Nations Convention on the Law of the Sea, its implementing agreements and the newly established institutions resulting from it, as well as a review of United Nations system activities and agreements relating to oceans and seas, see the annual reports of the Secretary-General on oceans and the law of the sea, submitted to the General Assembly and its open-ended informal consultative process on oceans and the law of the sea (A/55/61 and A/56/58).

[4] United Nations, *Treaty Series*, vol. 996, No. 14583. There are currently 123 parties to the Convention.

[5] See, for example, *Status of Coral Reefs of the World, 2000*, Clive Wilkinson, ed. (Queensland, Australia, Queensland Institute of Marine Science, 2000).

[6] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex I.

[7] See United Nations Environment Programme, *Convention on Biological Diversity* (Environmental Law and Institution Programme Activity Centre), June 1992.

[8] A/51/116, annex II.

[9] For further information on the GPA and its Clearing-House, see www.gpa.unep.org.

[10] See *Official Records of the Economic and Social Council, 1999, Supplement No. 9* (E/1999/29), chap. I, sect. C, decision 7/1, para. 3 (a); see also report of the Secretary-General to the Commission on Sustainable Development at its seventh session on oceans and seas (E/CN.17/1999/4, paras. 14-15).

[11] *International Fisheries Instruments* (United Nations publication, Sales No. E.98.V.11), sect. III.

[12] Ibid., sect. I; see also A/CONF.164/37.

[13] Ibid., sect. II.

[14] IPCC, *Third Assessment Report. Volume I: Climate Change 2001: The Scientific Basis*, January 2001. The report's Summary for Policymakers is available at *http://www.ipcc.ch*. The complete three-volume Third Assessment Report of IPCC will be submitted for final review to an intergovernmental conference in Accra, Ghana, in March 2001.

[15] *Official Records of the Economic and Social Council, 1999, Supplement No. 9* (E/1999/29), chap. I, sect. C, decision 7/1, para. 38.

[16] For further information on the activities of the ACC Subcommittee on Oceans and Coastal Areas, see: *http://ioc.unesco.org/soca*.

[17] For example, the International Seabed Authority, the International Tribunal for the Law of the Sea and the Commission on the Limits of the Continental Shelf began functioning in 1994, 1996 and 1997, respectively.

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Water: a key resource for sustainable development*

Report of the Secretary-General

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* This report was prepared by the ACC Subcommittee on Water Resources as task manager for chapter 18 of Agenda 21, with contributions from other United Nations agencies and international organizations. The report is a brief factual overview, which intends to inform the Commission on Sustainable Development on key developments in the subject area.

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I. Introduction

1. The present report reviews the implementation of and challenges posed by chapter 18 of Agenda 21, Protection of the quality and supply of freshwater resources. It focuses on the current status of freshwater resources and services, taking into account cross-cutting issues throughout Agenda 21, and the essential water stewardship components that need to be in place for implementing integrated water resource management.

2. Water is a finite natural resource necessary for the sustenance of life and ecological systems and a key resource for social and economic development. Despite improvements in water-use efficiency, particularly in developing countries, the use and demand for freshwater and the incidence of water pollution have increased as a result of population growth and expanding economic activities. During the past decade access to safe water supply and adequate sanitation has barely kept pace with population growth, and the demand for water, food and fibre production is on the increase.

3. In order to meet basic human and ecological needs and services, societies need to address and solve several serious challenges, including the intensified use and abuse of finite and vulnerable water resources and their unequal geographical distribution; and inadequate and inequitable investments in human and institutional capacity-building as well as inappropriate investments in infrastructure for water services, including sanitation.

4. In the next two decades it is estimated that water use by humans will increase by 40 per cent, and that 17 per cent more water will be needed to grow food for growing populations in developing countries. One third of the countries in water-stressed regions of the world are expected to face severe water shortages in this century. By 2025 there will be approximately 6.5 times as many people, or 3.5 billion, living in water-stressed countries than in 2000. The increasing pollution and depletion of surface and groundwater resources exacerbate the situation. It is estimated that more than half of the world's major rivers are seriously polluted and depleted. It is also necessary to allocate adequate water resources to sustain ecological functions and systems.

5. The United Nations Millennium Assembly Declaration sets the goal of halving the number of people who are unable to reach or to afford safe drinking water by 2015. The Declaration also aims at discontinuing the unsustainable exploitation of water resources by developing water management strategies, at the regional, national and local levels, that promote both equitable access and adequate supplies. Currently at least 1.1 billion people lack access to safe water supply, and almost 2.5 billion lack adequate sanitation, with the predominant majority living in developing countries. To meet the Millennium Assembly water supply target, an additional 1.6 billion people will require access to safe water. To halve the proportion of people without access to adequate sanitation would require that another 2.2 billion people be provided with facilities by 2015.

II. Strategic approaches to sustainable water development and management

A. The need for an integrated approach to freshwater resources

6. Since the United Nations Conference on Environment and Development (UNCED) in 1992, the international community has made considerable effort to raise awareness about water resources concerns and management. The UNCED integrated water resources management principles (chapter 18 of Agenda 21) have been elaborated upon and refined by several other international water meetings, including, the United Nations Expert Group Meeting on Strategic Approaches to Freshwater Management and the Commission on Sustainable Development at its sixth session (1998). However, despite many major international water meetings that have had an impact on the formulation of integrated national water policies and programmes, the implementation of integrated water resources management has not been fully achieved in either developed or developing countries. Water management issues continue to be dealt with on the basis of fragmented sectoral approaches.

7. A supply-side approach, in combination with weak and fragmented institutional structures, still prevails in many countries, as water-related services are extended to promote public health and food

production. There is a growing consensus that integrated water resources management and demand-driven approaches offer more effective means of providing water for human consumption, development activities and food production, while alleviating the stress on the in situ ecological goods and services that are provided by freshwater. The focus on integrated water resources management and demand-driven approaches to management mark an important shift in thinking about how water is managed in terms of allocation coherency, efficiency, equity and service delivery.

8. It is now accepted that sustainable water development and management require the integration of social and economic concerns with environmental ones. Land-use planning and the sustainable management of forests, wetlands, mountains, oceans and coastal areas are important elements of the equation, since water and the water cycle are fundamental for all processes occurring in the biosphere. Land-based and aquatic ecosystems are water-dependent and particular importance must be given to the most vulnerable ecological areas. Environmental protection and concern should have a high priority for both upstream and downstream water resources allocation. Such concerns should also be applied to the construction of dams and water reservoirs which often serve multiple purposes for energy generation, flood control, irrigation, drinking water, recreation and navigation. Dams and reservoirs are associated with many social and environmental costs that have to be accounted for.

9. The increased incidence of natural and related environmental and technological disasters, triggered by earthquakes, volcanic eruptions, landslides, floods, drought and tropical storms, has resulted in significant human, social and economic losses, posing a major threat to the planet. Climate change, environmental degradation, population increase, rapid urbanization and industrialization and increasing poverty make societies more vulnerable to disasters. The recently released report of the Intergovernmental Panel on Climate Change foresees that global temperatures will rise faster and higher than previously predicted, causing an accelerated rise in sea level, with drought and floods as some of the consequences. Millions of people may be forced from low-lying coastal areas, while others may be driven from their land because of increasing temperatures and drought. The negative impact of these events serves as a major obstacle to the achievement of sustainable development. It is important to develop risk management and disaster reduction systems and to put in place early warning and monitoring systems and emergency preparedness measures in the most disaster-prone areas.

10. It is recognized that, in order to realize the potential of integrated water resources management, adequate funding, human and institutional capacity-building, and a realistic assessment of hydrological and other physical resources are required. These need to be combined with information dissemination and application of appropriate technological solutions and transfers, particularly for areas in developing countries that are already water-scarce. The process of transforming a fragmented water sector into a new strategic integrated one has been successful in some developing countries, particularly where they have benefited from coherent external development cooperation in capacity-building and in institutional strengthening at national, basin and local levels.

B. The role of stakeholders

11. During the past decade there has been an increasing recognition of the need to delegate water resources management to the lowest appropriate level and to promote public/private partnerships as a way to make more efficient and productive use of water resources. The major groups, including non-governmental organizations, farmers, local authorities, the scientific and technological community, business and industry, trade unions, indigenous people, children and youth and women, have become an integral part of the sustainable development and management of water resources at the international, national and local levels. The roles and achievements of the major groups have varied. For example, many non-governmental organizations have been more successful in building community awareness and local capacity than in providing technical support for water assessments, water supply and sanitation. Attempts to encourage the transfer of operation and maintenance to water-user associations have had mixed results, since the generally low economic returns on irrigated agriculture and uncertain land tenure provide little incentive for farmers to make long-term capital investments. At the international and national levels the Global Water

Partnership (GWP) is promoting and supporting various integrated water resources activities.

12. The potential for increased private intervention is considerable with regard to the provision of services to more affluent urban areas of developing countries. However, private-sector participation in the extension of services to the poor in urban and rural areas remains more problematic, hinging on pricing and cross-subsidy policies that would enable the private sector to generate a fair return on its investments. On average, only 30 per cent of the costs for water services are now recovered in developing countries. Irrigated agriculture, particularly large- and medium-scale schemes, and industrial water continue to rely upon government regulations and subsidies for the provision of low-cost water services.

13. While national and local governments are shifting from the provision of services to the promotion of an enabling environment, their overall role should not be diminished. If autonomous public and private utilities are to succeed in providing services and more efficient water use by all sectors, the existence of a stable and coherent regulatory environment is required. Water laws have been enacted in many countries, but some still lack a water resources law. In many cases there is a lack of political will to enforce water legislation; resources and other means needed are also scarce.

C. Information for decision-making

14. Freshwater is highly variable in time and space. Its quantity, quality and sectoral allocation and use need to be coherently and continuously monitored and managed. The collection of hydrological, meteorological, hydrogeological, ecological and socio-economic information for water resources assessment and monitoring is essential for informed decision-making. Recent developments in information and communication technologies are fundamental for the dissemination of scientific and technological knowledge. Important progress in organizing information retrieval and diffusion has been made possible by technologies, such as geographic information systems (GIS) and computerized databases of water resources and related socio-economic information. Such technologies, combined with capacity-building, still have to be made available on a much larger scale in developing countries. Despite innovative information technologies, data collection at the field level remains crucial for sound and accurate water resource and management assessments. Unfortunately, it is often disregarded. Financial constraints have reduced the ability of public service institutions in charge of water resources to collect data at the field level in many developing countries. In many cases there has been a decline in the quantity and quality of information on water resources, and their uses.

15. Following the request of the Commission on Sustainable Development at its session for a periodic assessment of strategic approaches to freshwater development and management, the ACC Subcommittee on Water Resources is preparing, with the support of donors, a world water development report. The report aims to provide continuous and systematic qualitative and quantitative water resources assessments and analyses of critical problems related to water resources stewardship. It will, to a great extent, be based on socio-economic, hydrological, meteorological and hydrogeological data compiled by United Nations agencies.

D. International cooperation and national mechanisms for institutional capacity-building

16. There is no single international institution that deals exclusively with water resources issues. Those issues are by their nature cross-cutting and multidisciplinary, and any international institutional set-up must deal with a wide range of related environmental, social and economic questions at all levels. Taking this into account, there is need for international organizations involved in the water sector to further prioritize coordination, collaboration and integration of work.

17. During the past decade there has been increasing awareness of the need for riparian States to cooperate on matters related to shared water resources and on integrated water resource management strategies. Such cooperation should take into account agreements that are of relevance to water issues, such as the United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, and the Convention on

Wetlands of International Importance, Especially as Waterfowl Habitat (Ramsar Convention).

18. Another related issue is the strengthening of international cooperation in the areas of finance, institutional and human capacity-building, research and information-sharing and technology transfer. Technical cooperation is an important tool to support regional, national and local integrated water resources activities in developing countries. Equally important is to strengthen South/South cooperation schemes, taking advantage of all new developments and opportunities for cooperation among Governments, the private sector, non-governmental organizations, multilateral organizations and local communities.

19. During the 1990s, the execution of certain technical cooperation projects of the United Nations system shifted from United Nations agencies to national agencies, in an effort to build up and strengthen governmental institutions. United Nations agencies now play more of a support role, providing, at the request of Governments, technical assistance in capacity-building and strengthening water resources institutions. That support is considered by many developing countries to be an important element in implementing integrated water resources management.

E. Finance for sustainable water development and management

20. Financial commitments to water supply and sanitation have overall remained unfulfilled. Even though some developing countries have increased public spending in the sector, the gap between the levels of investment needed to achieve full water and sanitation coverage and the levels of investment actually made is considerable. Recent estimates suggest that Governments in developing countries spend some US$ 10-25 billion annually on water supply and sanitation, with a major portion being spent on higher-level services in urban centres. An additional $25 billion was spent by private investors on water and sanitation infrastructure in developing countries between 1990 and 1997. Strikingly, investments made to the urban water-supply sector have not even been sufficient to prevent the decline in relative coverage, let alone the substantial increase in the number lacking access to safe water supply. It is also important that adequate resources be made available for improving water resources management structures.

21. In recent years the international system has witnessed a decline in official development assistance (ODA) and an increase in foreign direct investment (FDI). The potable water supply sector has not been able to attract sufficient FDI funds, partly because of low-cost recovery. The difficulty of involving the private sector shows that public funding is still crucial for water-sector investments. The trend of declining ODA and difficulties of tapping into FDI are disturbing, especially in view of the massive investments that will be required to halve the number of people without safe water supply by 2015.

22. It is evident that both internal and external resources have to be generated en masse if an integrated water resources approach and universal safe water and adequate sanitation are to be realized in the foreseeable future. Although some developing countries witnessed significant economic growth during the 1990s, they were unable to achieve major increases in water supply and sanitation service coverage. Their ability to increase internal funds as well as external loans was clearly undermined by high levels of external debt.

III. Sustainable water development and management in a cross-sectoral context

A. Sustainable agriculture and rural development

23. Water is increasingly seen as a key factor in food production. Approximately 70 per cent of the world's exploited freshwater resource base is diverted to agriculture. The remaining 30 per cent is used by households and industry. The competition for water of sufficient quantity and quality is intensifying as water resources development opportunities become more constrained in many countries. It is acknowledged that an improvement in water-use efficiency, combined with increased water availability, is essential to meeting present and future water needs for increased food production. Although some progress has been made in increasing the efficiency of agricultural water use in public irrigation systems, only 30 per cent of the water supplied is actually used by crops and plants. More efficient technologies, being used by some countries, have proved effective in reducing water use. Yet many

countries are approaching water-scarcity conditions. Few are equipped with the financial and institutional means to ensure food security, either through food importation or more efficient management of agricultural production and food demand. Given that the number of water-scarce and food-deficit countries is on the increase, serious concerns have to be raised about where food, and the water to grow it, are going to come from. This implies that international, national and local trade systems and markets will face new commercial and financing challenges.

B. Promoting sustainable development of human settlements

24. It is estimated that by 2015, more than 50 per cent of the population in developing countries will live in urban areas. This urban growth poses a number of institutional, economic and environmental challenges for maintaining and extending services and for maintaining and improving water quality, especially sewage water treatment. In terms of water supply and sanitation, some progress has been made in the past decade. From 1990 to 2000 the percentage of the total population in developing countries with access to safe water increased from 72 to 78, whereas for sanitation it increased from 42 to 52. In most urban water systems in developing countries, water that is unaccounted for amounts to as much as 50 per cent of total withdrawals. To achieve the international targets of reducing by half the proportion of people without access to water and adequate sanitation, it is estimated that more than 1 billion people will need to be served with a water supply and almost 1.1 billion people served with adequate sanitation in urban areas. Even though urban areas are expected to accommodate more people than rural areas, there will be a steady increase in the absolute number of the world's rural population over the next 20 years. The overall growth in population, coupled with the demographic transition to urban areas, will have several socio-economic implications and will further intensify competition both within the urban and rural settings and between urban and rural water uses.

C. Combating poverty

25. The provision of safe and reliable water supply and sanitation services is key in maintaining public health, productivity and the dignity of poor populations. Bulk water services for agricultural and industrial activities are also essential in promoting employment and income-generation among low-income groups. These services continue to be heavily subsidized in both developed and developing countries. But in some cases, due to the shifting role of Governments from service providers to promoters of an enabling environment, central and local governments are progressively withdrawing, without an appropriate transition period, from the provision of water services, leaving some parts of the population without services. In these cases, poor people may become increasingly exposed to water shortages, leading to public health risks and economic hardship. A disturbing fact is that poor people with the most limited access to water supply services often have to pay private water vendors more for water than those connected to municipal supplies. Figures from the United Nations Centre for Human Settlements and the Water Supply and Sanitation Collaborative Council for some cities in Africa, Latin America and Asia show that poor people without municipal connections have to pay approximately 5-28 times more per water unit. In addition, poor people relying on private water vendors are provided with water of non-guaranteed quality.

D. Social aspects of sustainable water development and management

26. Promoting and facilitating human resources development, particularly for women, indigenous peoples and local communities, is a necessary but not sufficient prerequisite for efficient water resources management. Human capacity-building through education and training should, to a much greater extent, be combined with institutional capacity-building. By excluding women, indigenous peoples and local communities in education and health programmes and in managerial and administrative functions, the facilities installed may not suit their requirements or take advantage of their potential as managers and operators. Hence, basic knowledge of water resources development and practices applicable for local conditions, particularly among women, should play a significant role in how local water resources are managed. There is also a simultaneous need for institutional capacity-building to promote autonomous agencies responsible and accountable for integrated water resources management and to support transparent

decision-making processes and division of responsibilities.

IV. Sustainable water development and management challenges

27. The task ahead is to determine how Governments, the private sector and civil society, with the support of the United Nations system, will meet the social, economic and ecological challenges posed by the increased and intensified use and abuse of finite and vulnerable water resources and the necessary expansion of access to safe water supply and adequate sanitation facilities for social and economic activities. A minimum flow of water resources is also required to sustain ecological integrity, particularly in ecologically vulnerable areas. The integrated water resources management approach is instrumental in dealing with these challenges. In promoting and facilitating sustainable water development and management, it is paramount:

(a) To promote social stability and adaptability to environmental change, by applying integrated water resources management strategies, disaster reduction schemes and equitable and efficient allocation and distribution of water resources;

(b) To promote and raise awareness, and to build human and institutional capacity, through participation by stakeholders and partnerships among riparian States and between national and local user-sectors and the public and private sector;

(c) To provide access to safe water supply and adequate sanitation for poor people as an essential component in poverty alleviation measures, with a view to improving health, economic productivity, food security and human dignity;

(d) To protect the quality of surface and groundwater and aquatic ecosystems;

(e) To strengthen international institutional arrangements, demand-driven technical cooperation and financing for sustainable water resources development and management;

(f) To strengthen the enabling role of Governments to enact and enforce water legislation and strengthen local water management and service capacities.

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Global status of biological diversity*

Report of the Secretary-General

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* The present report was prepared by the United Nations Environment Programme as task manager for chapter 15 of Agenda 21, with contributions from other United Nations agencies and international organizations. The report is a brief factual overview, which is intended to inform the Commission on Sustainable Development on key developments in the subject area.

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Introduction

1. Current conditions of global biodiversity are a cause of great concern. Despite the continued efforts of the international community, widespread biodiversity losses continue to occur and thus the status of biodiversity in terms of species, habitats and ecosystems has not significantly improved in most countries.

2. The present report reviews accomplishments and constraints in the area of biodiversity conservation and sustainable use including species, protected areas, and coral reefs, and presents issues for further consideration.

I. Achievements and constraints

A. Establishing the strategic framework for action

3. The Convention on Biological Diversity[1] has emerged as the principal instrument relevant to the implementation and achievement of the objectives of sustainable conservation and use of biological resources as stipulated in chapter 15 entitled "Conservation of biological diversity" of Agenda 21.[2] With its threefold objectives, namely, conservation, sustainable use, and the fair and equitable sharing of benefits derived therefrom, the Convention has provided a comprehensive and almost universal framework and process for synergy and collaboration among biodiversity-related multilateral environmental agreements (MEAs) and action plans.

4. The adoption of the Cartagena Protocol on Biosafety by the Conference of the Parties to the Convention, in its decision EM-1/3 of 29 January 2000,[3] was a major millennial milestone, the Protocol being the first global environmental treaty that operationalizes the precautionary approach to protecting biodiversity from the potential risks posed by living modified organisms (LMOs) resulting from modern biotechnology. It establishes an advanced informed agreement (AIA) procedure for ensuring that countries are provided with the information necessary to make informed decisions before agreeing to the import of LMOs into their territory. Its effective implementation will bring to the fore the complexity of the whole question of integrating biodiversity issues into international and national economies.

5. The Conference of the Parties to the Convention has launched comprehensive programmes of work addressing 5 critical ecosystem-based thematic areas and 13 cross-cutting issues. The Conference of the Parties decided that the ecosystem approach should be the primary framework for action to be taken under the Convention. The Convention defines an ecosystem as "a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit" (article 2). The adoption of the ecosystem approach (decision v/6) and the decision at the fifth meeting of the Conference of the Parties, held in Nairobi, to develop a strategic plan for the Convention (decision v/20) will greatly contribute to the establishment of a firm policy foundation.

6. Other biodiversity-related conventions and processes including the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),[4] the Convention on the Conservation of Migratory Species of Wild Animals,[5] the Convention on Wetlands of International Importance, Especially as Waterfowl Habitat (RAMSAR Convention),[6] the Convention for the Protection of the World Cultural and Natural Heritage[7] meetings of regional seas conventions and the Global Biodiversity Forums have made significant contributions in specific areas of the sustainable management and use of the world's biodiversity.

7. The five-year review of the UNCED process (Earth Summit plus five), 1997; the Millennium Summit of the United Nations, 2000; and the first Global Ministerial Environment Forum, 2000, have given biodiversity the high-level political profile needed to galvanize action in favour of the conservation, and sustainable use of biological resources and the requisite benefit-sharing.

8. The restructuring of the United Nations Environment Programme (UNEP) and the strengthening of its role/mandate in the field of environment as per the Nairobi Declaration on the Role and Mandate of the United Nations Environment Programme[8] since the five-year review of the United Nations Conference on Environment and Development process has had a significant input on its work in the coordination, interlinkages and synergies among, and

support to, MEAs including biodiversity-related conventions and processes. The following meetings have been convened by UNEP in this regard:

- The Meeting to Assess the Need for a Second Interlinkages Assessment Report, Bonn, 26 October 1999. An offshoot of this meeting was the Millennium Ecosystem Assessment project;
- The First Consultative Meeting of the Subsidiary Scientific and Technical Bodies and Secretariats of Multilateral Environmental Conventions, Bonn, 25 and 26 October 1999;
- The Second Global Meeting of Regional Seas Conventions and Action Plans, The Hague, 5-8 July 1999;
- The Third Global Meeting of Regional Seas Conventions and Action Plans, Monaco, 6-10 November 2000;
- The Ninth Meeting on Coordination of Multilateral Environment Agreement Secretariats, Nairobi, 11 and 12 February 2001.

9. The preparation of national biodiversity strategies and action plans (NBS/APs) was among the significant achievements produced. With over 125 developing countries and countries with economies in transition in addition to the majority of developed countries, the next stage, namely, implementation of the NBS/APs, will greatly contribute to effective implementation of the Convention on Biological Diversity as well as the objectives of chapter 15 of Agenda 21.

10. The recognition and wide acknowledgement of the need for streamlining and harmonizing national reporting for all biodiversity-related conventions are another significant achievement. This will lead to improved monitoring of the effectiveness of measures adopted on various aspects of conservation and sustainable use of biodiversity.

11. Countries have experienced major constraints owing to lack of national capacities as a result of lack of adequate new and additional financial resources. This has led to unfulfilled expectations in key issues, such as transfer of technologies; equitable benefit-sharing mechanisms; rehabilitation and restoration of degraded ecosystems; and liability and redress.

B. Conservation and sustainable use of biodiversity

1. A global species extinction crisis

12. According to the 2000 International Union for Conservation of Nature and Natural Resources-World Conservation Union (IUCN) Red List of Threatened Species, the third wave of a major global species extinction crisis is emerging.[9] The Red List provides an excellent set of quantitative criteria for assessing the status of species and their habitats. The List has been recognized as the most comprehensive list of globally threatened species ever compiled. This is especially true if one also considers its companion volume, the 1997 IUCN Red List of Threatened Plants, which lists an extraordinary number (34,000) of species of plants.

13. The 2000 IUCN Red List highlights many species that could be lost in the first few decades of the twenty-first century if the global community does not greatly intensify its level of support, involvement and commitment. Specifically, the Red List:

- Highlights that the total number of listed species has increased dramatically in the last five years; for example, species of mammals have increased from 1,096 to 1,130 and species of birds from 1,107 to 1,183. The number of critically endangered species has also increased; for example, the number of critically endangered species of mammals has increased from 169 to 180 and the number of critically endangered species of birds, from 168 to 182. The global community should take the loss of species very seriously indeed;
- Includes 11,046 species threatened with extinction, 816 species that have already become extinct or extinct in the wild, and 4,595 species listed as being data-deficient or in the specific taxa or subpopulation-level assessments, totalling 18,276 taxa. The 11,046 species that are listed as threatened with extinction, although less than 1 per cent of the world's described species, include 24 per cent of all mammal species and 12 per cent of all bird species. In other words, one in every four mammal species and one in every eight bird species are facing a high risk of extinction in the near future. Approximately 25 per cent of reptiles, 20 per cent of amphibians and 30 per cent of fishes (mainly freshwater) are

listed as threatened. The 2000 Red List includes 5,435 animal species threatened with extinction compared with 5,205 in 1996;

- Highlights that the number of threatened inland water species has increased in all groups except for the molluscs. This indicates the extremely vulnerable nature of freshwater habitats. Species living in freshwater ecosystems are likely to be facing a much higher risk of extinction than their counterparts in the terrestrial and marine environments.

14. In order to gain an understanding of which habitats are the most important for threatened species, an attempt was made to identify/record the major habitats in which each threatened species occurred. Over 45 major habitats have been identified for this purpose under an eight-category hierarchical structure of the major threat types (that is to say, the major processes threatening biodiversity conservation and sustainable use). These include habitat loss, direct exploitation, indirect effects, natural disasters, atmospheric pollution, land/water pollution, intrinsic biological factors, and other miscellaneous (unspecified) factors.

15. From the IUCN Red List it is clear that the most pervasive and overriding threat to birds, mammals and plants is habitat loss and degradation, affecting 89 per cent of the threatened birds sampled, 83 per cent of the threatened mammals sampled and 91 per cent of the threatened plants sampled. The three primary causes of habitat loss are agricultural activities (including crop and livestock farming, and timber plantations), extraction activities (including mining, fisheries, logging and harvesting) and development (which includes human settlements, industry and all the associated infrastructure like roads, dams and power lines).

16. Two key threats to mammals are habitat fragmentation (6 per cent of all species) and deforestation (9 per cent of all species), both of which are due to unspecified causes. It is noteworthy that in an analysis of the threats faced by threatened species in the United States of America, habitat loss and degradation emerged as the greatest threat, affecting more than 80 per cent of threatened species.[10] Direct habitat loss and exploitation also have a major impact on birds (37 per cent of all threatened species), mammals (34 per cent of all threatened species) and plants (8 per cent of all threatened species). This category can be broken down into hunting and collecting activities and the impacts of legal and illegal trade. The breakdown shows that 338 threatened bird species (28 per cent of all species studied), 212 mammals (29 per cent of all species studied) and 169 plants (7 per cent of all species studied) are impacted by hunting and collecting. Trade impacts 13 per cent of threatened bird species and 13 per cent of threatened mammal species, while less than 1 per cent of the threatened plant species are impacted by trade.

17. Invasive species are also an important threat, affecting 350 species (30 per cent of all threatened bird species studied), and 361 species (15 per cent of all threatened plant species studied). This threat appears to have less impact on mammals, affecting only 69 species (10 per cent of all threatened mammal species studied). The extinction of most bird species since 1800, especially those on islands, is largely attributed to the introduction of alien invasive species.[11] Therefore, it is alarming to note that 30 per cent of threatened bird species studied are currently being affected by invasive species.

18. Comparing the top six most important habitats for threatened birds and mammals, five of these habitats are common to both birds and mammals. There is complete agreement on the top two habitats for both groups, namely, lowland and mountain tropical rainforest. The analysis of the bird habitats by BirdLife International indicates that threatened birds are highly habitat-restricted with 883 species (74 per cent of threatened bird species) almost entirely dependent on a single habitat type. Of these, 75 per cent are dependent on forests. More than 900 threatened bird species use tropical rainforests and 42 per cent of these are found in lowland rainforest while 35 per cent occur in mountain rainforests.[12]

19. A further 4,595 species are on the brink of moving into one of the threatened categories unless something is done soon to reverse their continued population decline. Apart from the sheer numbers of species listed as being threatened or potentially threatened, the rapid movement of many species of mammals and birds through the threatened categories towards being critically endangered in just the last four years is extremely alarming. Human activities are the cause of this deteriorating situation, which is increasingly being referred to as the global extinction

crisis. The global community has the responsibility and the ability to reverse the situation. To do so will take both knowledge and commitment.

2. Global protected areas network

20. It is a widely held view that protected areas are the most effective means of in situ conservation of biological diversity. Conservation biologists advocate that protected areas should be as large as possible in order to maximize the degree to which their contents retain their integrity; minimize risks of species' extinction; and maximize representation of ecological communities and their constituent species.

21. A World Conservation Monitoring Centre (WCMC) publication indicates that the number and extent of the global network of protected areas (PAs) have grown steadily throughout the latter part of the twentieth century.[13] The world's network of 30,350 protected areas extends over a total of 13,232,275 square kilometres (km^2) which represents 8.83 per cent of the total land area. The network is extensive from a global perspective but there are many gaps at the national level. The number of protected areas established declined somewhat in the five-year period 1990-1994 as compared with the previous decade. However, there is little or no evidence of any decline in the rate of growth in the extent of this network during the most recent five-year period 1995-2000. This indicates that there are continuing efforts by Governments to establish new protected areas.

22. It is not yet possible to quantify precisely the marine and terrestrial components of the global network of PAs. However, the two largest "marine" protected areas are Greenland National Park (972,000 km^2) which is largely terrestrial and the Great Barrier Reef Marine Park (344,800 km^2) which is predominantly marine in character.

23. A number of protected areas have also been established under private and other non-governmental initiatives. A pilot study by WCMC indicates that private initiatives contribute significantly to in situ biodiversity conservation in many parts of the world.[14] The pilot study was limited to countries in Eastern/Southern Africa, where private protected areas in Kenya, Namibia, South Africa and Zimbabwe are contributing 1 to 7 per cent of total land area in the countries concerned, thereby constituting larger areas than the legally designated protected areas managed by government agencies. The extent of private protected areas in other parts of the world is presently non-quantifiable, but it is likely to be significant, particularly in the Americas and Europe. WCMC is planning to extend its Protected Areas Database to include the private sector in order to obtain a comprehensive cross-sectoral picture of the global network.

24. The United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and the Biosphere Reserves Programme has made a significant contribution to biodiversity conservation, its sustainable use and the sharing of benefits derived therefrom. This interdisciplinary programme of research and training within the natural and social sciences has promoted a more effective use and conservation of the resources of the biosphere, and improved the global relationship between people and the environment. It is based on the creation and management of a biogeographically representative network of biosphere reserves, where, through appropriate zoning and management mechanisms, the conservation of ecosystems and their biodiversity is integrated with the sustainable use of natural resources for the benefit of local communities, including relevant research, monitoring, education and training activities.

3. Coral reefs

25. Coral reefs are among the most biologically diverse ecosystems on our planet, and also some of the most ancient. Although they occupy less than one quarter of 1 per cent of the marine environment, coral reefs are home to more than a quarter of all known marine fish species. Globally, more than 400 marine protected areas contain coral reefs; however, at least 40 countries lack any marine protected areas for conserving their coral reef ecosystems.

26. *The Reefs at Risk* report, 1998, has estimated that as much as 58 per cent of the world's coral reefs are at high or medium risk from human impact.[15] The worst threats include overexploitation and destructive fishing techniques, coastal development, inland pollution and sedimentation and marine-based pollution. Lately, coral bleaching has been added to the list. Alarmingly, the reefs in South-East Asia, noted for their extraordinary high levels of biodiversity, are also among the most threatened.

27. The *Status of Coral Reefs of the World: 2000 Report* confirms that the world's coral reefs continue to decline.[16] In the report, it is predicted that over half of the coral reef areas may be lost in 30 years, if efforts to conserve them are not enhanced. To halt and eventually reverse the global degradation of coral reefs, Governments and international agencies have jointly initiated the International Coral Reef Initiative (ICRI), which issued an international call for coral reef conservation.

4. Global biodiversity monitoring

28. It should be observed that, to date, biodiversity assessment activities are mainly static assessments, that is to say, status inventory. Trends and rate of change (trend assessment), particularly at the ecosystem level, are more crucial in determining long-term sustainability. A well-coordinated and structured biodiversity monitoring programme would greatly contribute to improvements of effective management, secure the integrity of existing protected areas and provide information for creation of corridors connecting small and/or key protected areas.

II. Issues for further consideration

29. The conservation and sustainable use of biodiversity remain a challenge to all stakeholders in all countries. They need to be an integral part of local and national strategies aimed at promoting sustainable development, addressing, among other things, the integration of biodiversity issues into all sectors, access to biodiversity and to relevant technology, compatibility of conservation and sustainable use including benefit-sharing mechanisms, utilization of aquatic, marine, coastal and terrestrial biological and genetic resources, and the application of the precautionary approach as stipulated in the Cartagena Protocol on Biosafety.

30. The global extinction crisis remains among the highest priorities for the global community in the decades to come. It would be important to regularly update and share the IUCN Red List and encourage countries to contribute relevant information.

31. The development of a coordinated biodiversity monitoring programme, which would provide adequate qualitative and quantitative information in support of policy development and decision-making on the conservation and sustainable use of biological resources, is urgently required.

32. There is need for greater international cooperation and collaboration among global and regional MEAs. Due regard should be paid to the recognition of the sovereign rights of States.

33. The level of support and commitment to biodiversity conservation, its sustainable use and equitable access and benefit-sharing mechanisms needs to be increased. In this regard, available basic biodiversity knowledge and information need to be linked and improved, so that they can be used by planners and decision makers to establish priorities and prevention measures and to take appropriate remedial actions.

Notes

[1] See United Nations Environment Programme, *Convention on Biological Diversity* (Environmental Law and Institution Programme Activity Centre), June 1992.

[2] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

[3] See UNEP/CBD/EXCOP/1/3 and Corr.1, part two, annex.

[4] United Nations, *Treaty Series*, vol. 993, No. 14537.

[5] Ibid., vol. 1651, No. 28395.

[6] Ibid., vol. 996, No. 14583.

[7] Ibid., vol. 1037, No. 15511.

[8] *Official Records of the General Assembly, Fifty-second Session, Supplement No. 25* (A/52/25), annex, decision 19/1, annex.

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Management of toxic chemicals and hazardous and radioactive wastes*

Report of the Secretary-General

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* This report was prepared by the United Nations Environment Programme as task manager for chapters 19 and 20 of Agenda 21 and the International Atomic Energy Agency as task manager for chapter 22, with contributions from other United Nations agencies and international organizations. The report is a brief factual overview, which is intended to inform the Commission on Sustainable Development on key developments in the subject area.

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I. Introduction

1. The present report deals with three distinct but related chapters of Agenda 21 — namely, 19, 20 and 22, having to do with the treatment, management and disposal of hazardous or potentially hazardous materials. With regards to chemicals, Agenda 21 notes that use of chemicals is essential to meet the social and economic goals of the world community and that a great deal remains to be done to ensure the environmentally sound management of toxic chemicals. The goal of Agenda 21 with respect to hazardous wastes is to prevent and, to the extent possible, minimize, the generation of such wastes within the framework of integrated life-cycle management. The mandate with respect to radioactive wastes is to ensure that they are safely managed, transported, stored and disposed of, with a view to protecting human health and the environment. Agenda 21 recognizes the role of the International Atomic Energy Agency (IAEA) as the United Nations agency with specific statutory responsibilities for the safety of radioactive waste management.

II. Management of toxic chemicals

A. Accomplishments and constraints

2. The Inter-Organization Programme for the Sound Management of Chemicals (IOMC) was established in 1995 to serve as a mechanism for coordinating efforts of intergovernmental organizations in the assessment and management of chemicals. All IOMC participating organizations carry out activities to facilitate information-exchange concerning their activities to promote chemical safety. Recognizing that Internet access is very limited in some countries, IOMC participating organizations, with the support of donors, have begun a programme to install computers and provide training for developing countries on accessing chemical safety information through the Internet.

3. All IOMC participating organizations carry out, within their respective mandates, a range of training and technical assistance activities as a contribution to regional and national efforts to strengthen capacities and capabilities for the sound management of chemicals. In some cases — e.g., for ozone-depleting substances or for persistent organic pollutants — new and additional resources have become available through mechanisms such as the Global Environment Facility (GEF). Collaboration at the national and international levels is required to ensure that assistance activities related to international priority chemicals are implemented in such a way that "spill over" effects are ensured, which helps countries to manage the many toxic chemicals not subject to international attention.

4. The International Conference on Chemical Safety, held in Stockholm in 1994, created the Intergovernmental Forum on Chemical Safety (IFCS). IFCS identified the type of assessments made by the Organisation for Economic Cooperation and Development (OECD) and the International Programme on Chemical Safety (IPCS) which would count as international assessments in the United Nations Conference on Environment and Development. In 1994 IFCS predicted that 500 chemicals would be assessed by 2000. The number actually assessed (286) falls considerably short of the target. Reasons for the shortfall are lack of adequate resources, in Governments, IPCS and OECD, and the long time needed to streamline assessment procedures to allow increased production.

5. IPCS, spearheaded by the World Health Organization (WHO), has provided state-of-the-art guidance documents on methodologies for assessing risks from exposure to chemicals. Work has also progressed on emerging issues, particularly endocrine-disrupting chemicals, assessing risks for children, and integrated health and environmental risk assessment. Within the framework of the project on harmonization of approaches to risk assessment, work has progressed in various areas, including risk assessment terminology (jointly with OECD), cancer risk assessment, reproductive and developmental toxicity, exposure assessment and uncertainty/variability analysis.

6. In the field of risk assessment, IPCS is leading a major project on harmonization of approaches to risk assessment, with emphasis on human health. OECD continues to develop harmonized test guidelines, testing strategies, and approaches to environmental assessment. The results of this work, conducted in cooperation with other IOMC partners, will be instrumental in developing confidence in, and acceptance of, hazard and risk assessments globally. The ultimate goal is to attain convergence in the methodologies currently in use.

7. Close to 50 national institutions are involved in a project, managed by the International Labour Organization (ILO) and financed by the European Union (EU) and ILO, to make available International Chemical Safety Cards (ICSC). Currently 1,300 cards are available on the Internet, at no charge and in 11 languages (English, French, Spanish, German, Japanese, Chinese, Korean, Thai, Urdu, Finnish, Swahili). Translation of the cards in Hindi, Bengla, Tamil, and Portuguese is ongoing or planned.

8. The ILO, OECD and the Committee of Experts on the Transport of Dangerous Goods have completed the technical basis for a globally harmonized system for the classification and labelling of chemicals. In 1999, the Economic and Social Council decided to establish the Subcommittee on the globally harmonized system of classification and labelling of chemicals, thus, highlighting the importance given to this issue.

9. The elaboration over the past 10 years of such a system is a formidable illustration of the capacity of countries, intergovernmental and non-governmental organizations and even individuals, to work together when the goal is one with the potential to benefit the whole world. Universal adoption of the globally harmonized system will provide a basis for uniform identification of chemical hazards, improve hazard communication, facilitate trade in chemicals, reduce the need for animal studies, and ultimately improve overall human and environmental safety in the production, transport, use and disposal of chemicals.

10. The lack of extrabudgetary funds has resulted in reduced participation in the globally harmonized system on the part of developing countries. Worldwide adoption of the system will occur only if adequate funding is made available to countries needing to build appropriate legal and technical infrastructures, including training at the enterprise level in the use of the system. It is estimated that the annual cost to participating countries and organizations is around US$ 3 million. It is hoped that the chemical industry will play a significant role in helping establish the system as a universal voluntary standard.

11. The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade was adopted in 1998. The Convention requires that chemicals and pesticides that have been added to the Convention because they are banned or severely restricted in at least one country in each of two regions shall not be exported unless explicitly agreed by the importing country. It also includes severely hazardous pesticide formulations that are too dangerous to be used in developing countries. The Convention will come into force 90 days after 50 countries have ratified it; until then, an interim voluntary procedure is being applied.

12. A guidance manual for establishing pollutant release and transfer registers has been developed through a multi-stakeholder approach. The manual has served as the basis in many countries for capacity-building activities for the introduction of registers. Currently 43 countries in all regions have a register or are in the process of developing one.

13. The text of a new treaty on persistent organic pollutants (POPs) was agreed in December 2000. The treaty, to be adopted and signed in Stockholm in 2001, inter alia, takes measures to protect health and the environment from 12 POPs or groups of POPs, includes provisions to include additional POPs to the treaty and prevent the introduction of new POPs into commerce, and provides for technical and financial assistance to developing countries and countries with economies in transition. The treaty will be named the Stockholm Convention on Persistent Organic Pollutants.

14. In 1993 the ILO adopted Convention No. 174, concerning the Prevention of Major Industrial Accidents, defining the relevant responsibilities, duties and rights of Governments, employers and workers. A related code of practice and a manual provide guidance on technical and safety issues.

15. New centres of poison information have been established in 25 countries. Guidelines on poison control, to provide Governments and health-care professionals with advice on setting up and strengthening poison centres, have been published. The IPCS database INTOX, on CD-ROM, provides information for poison centre professionals and clinical toxicologists. A globally harmonized system for data collection on human poisonings, toxic exposures and chemical incidents has been developed by the IPCS INTOX programme, with the involvement of experts from over 60 countries. The system is available in English, French, Portuguese and Spanish and is currently being translated into Arabic, Chinese and Russian.

16. All IOMC participating organizations took part in the preparation of national chemical management profiles in some 70 countries around the world. The profiles document and assess the existing infrastructure and capacities for the sound management of chemicals and serve in many cases as a starting point for coordination, priority-setting and technical assistance. The great majority of national profiles is available on the Internet through the UNITAR national profile home page.

17. Various United Nations agencies assist countries in awareness-raising and capacity-building for the safe management of chemicals and pesticides. Some examples include:

(a) The Integrated Pest Management programme of the Food and Agriculture Organization of the United Nations (FAO) and its support in the establishment and strengthening of pesticide regulatory frameworks;

(b) Training programmes of FAO and the United Nations Environment Programme (UNEP) to support national efforts to implement the new Rotterdam Convention (see para. 11);

(c) UNEP's comprehensive programme to assist countries in reducing and/or eliminating the release of persistent organic pollutants into the environment;

(d) Training courses on environmental and health-risk assessment and the management of toxic chemicals, conducted in a number of developing countries by WHO, through IPCS and its partner institutions;

(e) The services of the United Nations Industrial Development Organization (UNIDO) to reduce the use of toxic chemicals and the release of chemical wastes in selected subsectors, particularly in agrochemicals (pesticides), building materials (brick and cement), leather, petrochemicals, pharmaceuticals and biotech products, pulp and paper, and textile industries;

(f) The training and capacity-building programmes of the United Nations Institute for Training and Research (UNITAR) which support national efforts to develop coordinated and integrated national programmes for the sound management of chemicals, being implemented in partnerships with one or several IOMC participating organizations.

B. Issues for further consideration

18. There is a strong need for countries that have not already done so to ratify or otherwise accede to the chemicals-related conventions, including ILO Conventions No. 170 and No. 174, the Rotterdam Convention and the future Stockholm Convention on POPs.

19. A significant challenge will be to maintain the same degree of political and financial commitment to processes such as the Rotterdam Convention and the future Stockholm Convention on POPs once they enter the stage of implementation.

20. If progress is to be realized and international commitments made over the past eight years are to be met, an increase in priority and resources is essential.

21. Further work includes:

(a) The establishment of integrated and ecologically sound pest management strategies, including strategies for vector control;

(b) The identification, neutralization and safe disposal of obsolete stocks of pesticides and other chemicals, including polychlorinated biphenyls (PCBs);

(c) The adoption and entry into force of the convention on persistent organic pollutants;

(d) The implementation of systems for the prevention of major industrial accidents and for emergency preparedness and response;

(e) Measures to reduce the danger of severely hazardous pesticide formulations;

(f) Efforts to revise the FAO International Code of Conduct on the Distribution and Use of Pesticides;

(g) The expanded establishment of national poison control centres;

(h) The expanded establishment of pollutant release and transfer registers at the national level.

III. Management of hazardous wastes

A. Accomplishments and constraints

22. Cleaner production strategies, leading to the minimization of waste generation, have been

increasingly recognized by many Governments, industries and other institutions as effective ways to reconcile environmental protection with economic development. Countries have moved towards developing an enabling policy regime and establishing the necessary institutional framework to meet the needs of the user organizations. The establishment of national cleaner production centres (NCPC) is one example of this progress.

23. Within the United Nations system, an increasing number of agencies have emphasized the preventive approach in their work programmes, agendas and activities. The UNIDO/UNEP NCPC Programme and the ILO/UNEP Programme on Cleaner Production in Employers' Organizations are two examples. United Nations entities such as WHO, ILO, the United Nations Educational, Scientific and Cultural Organization and the World Bank are integrating the preventive approach in their publications, conferences and technical assistance activities.

24. Decision makers in all stakeholder groups (Governments, businesses, financial institutions, non-governmental organizations etc.) have increasingly easy access to quality and user-friendly information on cleaner technologies, technologies that treat hazardous wastes, operating practices, and policies required to achieve environmentally sound management of hazardous wastes.

25. The ECE countries have introduced the "5-R" policy and strategy, which promotes the principles embodied in cleaner production: reduction at source, replacement, recycling, recovery and reutilization.

26. The following points highlight some of the constraints and obstac es that need to be overcome:

(a) National legislation and regulations, where they exist, are often not well complied with or are not enforced, due to lack of capacity and resources. The process of preparing and enacting the appropriate legal framework has been slow;

(b) Many countries lack adequate institutional capacity in hazardous waste management, in monitoring and controlling imports of hazardous chemicals and hazardous wastes, and in preventing illegal traffic;

(c) Many Governments lack policy tools for developing with industry approaches to hazardous waste management. Many government officials and small and medium-sized enterprises do not have the necessary environmental awareness, expertise, and financial resources to deal with this issue;

(d) Industry, in many cases, views hazardous waste management as a burden and compliance as an obligation to be met only to the extent that the regulatory system requires it;

(e) Data and statistics on hazardous waste generation and transboundary movements, which are vital for making policies and strategies and also for monitoring progress are only beginning to be collected.

(f) Very slow progress has been made by international organizations in providing assistance to States in assessing the health and environmental risks resulting from exposure to hazardous wastes. Very few parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal have compiled statistics on the health or environmental effects of hazardous wastes;

(g) Governmental fiscal incentives are still not targeted at implementing environmentally sound policies, including cleaner production. Cost-intensive measures are often unimplemented owing to lack of financial resources.

B. Issues for further consideration

27. There is urgent need to strengthen national capacities for the effective management of hazardous wastes by supplementing resources for putting relevant policies and programmes into effect.

28. The private sector, particularly small and medium-sized enterprises, needs to be involved, sensitized and made aware of the seriousness of this issue and be included as a willing partner in launching programmes and activities.

29. Greater effort at the international level is required for environmental assessment of technologies and for making the information available to the decision makers who decide on a technology.

30. Hazardous waste management needs to be integrated and mainstreamed into routine business decision-making processes.

31. Attention now needs to be focused on consumption side of products — their useful life and

the disposal/discard phase — and not just on the manufacturing side.

32. Governments need to formulate policies so that fiscal incentives are made available to the users and developers of clean technologies. Innovative financing mechanisms, like revolving funds, need to be set up to facilitate implementation of cost-intensive cleaner production measures.

33. Awareness-raising programmes need to be intensified.

34. Governments need to provide a regulatory and non-regulatory framework, including economic instruments, that would ensure protection of health and the environment from hazardous wastes, so that industry can comply with the requirements of the Basel Convention while continuing to perform in the competitive economic and trade domains.

35. Life-cycle management and coherent energy policies need to be put into place to avoid displacement of problems to the waste sector.

36. New civil liability schemes need to be developed to generate a real insurance market worldwide, covering the transboundary movements of hazardous wastes and their management.

37. Efforts must continue to obtain additional ratifications of the Basel Convention and related protocols/agreements, particularly the Ban Amendment, to allow it to become legally binding.

38. The capabilities of developing countries to deal with hazardous wastes issues should be strengthened, by strengthening national hazardous waste management units in charge of developing and implementing the corresponding policies and strategies and by developing legislation and regulations and ensuring their enforcement.

39. The dissemination of up-to-date information on cleaner technologies, including environmental assessment of technologies, hazardous waste minimization and treatment technologies and information on policy interventions should continue.

40. Financial institutions and development banks, should be encouraged to develop innovative financing schemes to promote investments in cleaner production and hazardous waste minimization.

41. Environmental accounting and economic tools should be further developed, in order to understand the real cost of improper hazardous waste management and to orient industry and consumers towards cleaner processes and products.

IV. Management of radioactive wastes

A. Main accomplishments and constraints

42. In chapter 22 of Agenda 21 (para. 22.4), it is recommended that Member States, in cooperation with international organizations, promote policies to minimize and limit the generation of radioactive waste, and provide for its safe processing, conditioning, transportation and disposal.

43. Good progress has been made in this direction in many of the countries using nuclear power. The United States and France, the countries with the largest civilian nuclear electric power programmes, have reduced operational wastes from their nuclear power plants by factors of 4-5, when measured by volume, and by a factor of 10, when measured by radioactivity, over the past decade. This has been achieved by a combination of improved procedures and technology, and by the recycling and reuse of recovered materials within the plants. IAEA has provided a forum for information exchange and technology transfer on such technologies among Member States.

44. The scientific consensus reached at recent international technical meetings is that mature, sustainable and safe technologies exist for all areas of radioactive waste management, except the disposal of high-level and long-lived wastes.

45. During the past decade, new disposal sites for low- and intermediate-level radioactive waste have been established in the Czech Republic, Finland, France, Japan, Norway, Slovakia and Spain. There has been a trend away from disposal in shallow earthen trenches to disposal in near-surface concrete vaults or in mined underground caverns constructed tens of metres below the earth's surface. In 1999, the world's first geologic repository for the disposal of long-lived trans-uranic waste was opened at the Waste Isolation Pilot Plant (WIPP), in Carlsbad, New Mexico, United States.

46. Disused, sealed radioactive sources are a potential source of public radiation exposure if they are lost from regulatory control, and accidents involving sealed radiation sources, mostly in the medical sector, have led to serious radiation injuries and fatalities. Recently, international attention was directed at this problem by the initiation in 1999 of an action plan for the safety of radiation sources and the security of radioactive materials. The plan includes strategies for bringing the sources under control and for their safe management and disposal when they are no longer in use. IAEA has been assisting developing countries to render disused sealed sources safe by appropriate conditioning and storage techniques. Between 1996 and 2000, expert teams trained and qualified by IAEA visited 24 developing countries, where disused spent sources, mostly radium-226, were safely secured.

47. In chapter 22, Member States are also encouraged to support IAEA efforts to develop and promulgate radioactive waste safety standards as an internationally accepted basis for the safe and environmentally sound management and disposal of radioactive waste. IAEA standards covering all important areas of radioactive waste management are being developed. They address: national administrative arrangements for safe radioactive waste management, safety in the processing of waste for disposal, decommissioning of nuclear facilities, control of radioactive discharges, restoration of areas with radioactive contamination, and safe disposal of radioactive waste in near-surface and geological repositories. To date, 12 standards documents have been issued, the most important being the safety fundamentals document entitled *The Principles of Radioactive Waste Management*, which establishes the safety basis for radioactive waste management. It is planned that the corpus of radioactive waste safety standards will be completed within the next five years.

48. An event not envisaged in chapter 22 was the concluding of a legally binding instrument on the safety of radioactive waste management. In September 1997, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was adopted by a Diplomatic Conference convened by IAEA at its headquarters in Vienna. At present only two more of the required 25 States must ratify the Convention before it comes into force. The Convention incorporates important elements of the Code of Practice on the International Transboundary Movement of Radioactive Waste, which was developed in 1990. Improvement in the safety of radioactive waste management will be prompted by regular peer reviews of national reports.

49. In relation to paragraph 22.5 (a) of chapter 22, IAEA has been closely cooperating with relevant international organizations to ensure coordination of both format and schedule concerning the adoption of the latest version of the Agency's Regulations for the Safe Transport of Radioactive Material.

50. In paragraph 22.5 (b) of chapter 22, Member States are encouraged to bring about a final ban on the disposal of low-level radioactive waste at sea. Under the auspices of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention, 1972), the sea dumping of all types of radioactive waste was finally prohibited in 1994. The prohibition replaced the earlier voluntary moratorium, which had been adopted in 1983 by the contracting parties to the London Convention. In a related development, discharges of radioactive material to the marine environment from land-based sources are coming under increasingly stringent controls, especially in the North-East Atlantic where the 1998 Sintra (Portugal) ministerial statement of the contracting parties to the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) commits contracting parties to progressive and substantial reductions of discharges, emissions and losses of radioactive substances, with the ultimate aim of concentrations in the environment near background values for naturally occurring radioactive substances and close to zero for artificial radioactive substances.

51. Since the end of the "cold war", it has been recognized that there are areas of the earth affected by radioactive residues from nuclear weapons development and testing. Programmes are under way, especially in the United States, to remediate the affected areas and restore them to a state in which they can be reoccupied. IAEA has, at the request of Member States, organized assessments by international expert teams of the radiological situation at several of these sites, including the Bikini, Mururoa and Fangataufa atolls in the Pacific Ocean and Semey (formerly Semipalatinsk) in Kazakhstan.

52. Although progress is being made in many areas of radioactive waste management, progress towards developing repositories for high-level and long-lived radioactive waste has been slow. The preferred solution for the disposal of such waste is emplacement in deep underground (geological) repositories. Mainly as a result of public opposition to the location of such repositories, only one geological repository is so far in operation (the WIPP repository for United States Defence Department wastes). It is becoming increasingly recognized that progress towards resolving this problem can only be achieved through greater consultation among the proponents (usually the Government and its agencies) and the concerned public, and eventually through the involvement of the concerned persons (the "stakeholders") in the decision-making process.

53. One technical issue which confronts developing countries is the lack of a regulatory and technological infrastructure to manage radioactive waste safely, especially disused sealed sources. IAEA has a variety of programmes to help build capacity to manage radioactive waste in these countries, but the need exceeds the resources available.

B. Issues for further consideration

54. As nuclear facilities age, decommissioning in ways that assure safety for both workers and the public becomes important. Decommissioning gives rise to substantial amounts of radioactive waste which must be properly managed and disposed of. Due to the current unavailability of geologic repositories for high-level waste and unwanted spent fuel, several countries have placed them in centralized interim storage facilities. Finally, in the planning for geologic repositories, increased consideration is being given to approaches to disposal that are reversible and allow wastes to be retrieved.

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Energy and transport*

Report of the Secretary-General

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* This report was prepared by the Department of Economic and Social Affairs of the United Nations Secretariat as task manager for the areas of energy and transport, with contributions from other United Nations agencies and international organizations. The report is a brief factual overview, which is intended to inform the Commission on Sustainable Development on key developments in the subject area.

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I. Introduction

1. Energy and transport pose a basic dilemma for sustainable development in that both are necessary for socio-economic growth, yet they are associated with environmental degradation, especially with regard to atmospheric pollution. Affordable energy is key to poverty reduction and supports a whole range of related development goals, there are still 2 billion people who lack access to commercial energy. At the same time, the production and use of energy — especially through the combustion of fossil fuels — can and does create adverse environmental effects. Without remedial action these problems will further worsen as overall energy demand and use continue to rise. Furthermore, limited access to transport is often cited as a contributing factor to poverty, and public transport in low-income areas is now given higher priority by many urban planners.

2. Although neither energy nor transport is addressed explicitly in Agenda 21,[1] they are considered throughout the document, but primarily in chapters 9 (atmosphere) and 14 (agriculture and rural development) for energy, and chapters 7 (human settlements) and 9 (atmosphere) for transport. At its nineteenth special session in 1997, the General Assembly decided that energy and transport issues should be addressed at the ninth session of the Commission on Sustainable Development. Specifically, the General Assembly recognized the need for a movement towards sustainable patterns of production, distribution and use of energy and emphasized the overarching significance of energy for sustainable development; it also recommended a number of forward-looking transport policies to promote sustainable development, including working toward the elimination of lead in gasoline. Thus, the critical and pervasive role of both in the context of sustainable development is well understood.

II. Energy

A. Current situation

Energy trends

3. In the period 1992-1999, total world consumption of commercial primary energy increased by almost 10 per cent, despite the fact that global economic growth was reduced by the collapse of the former Soviet Union, political changes in Eastern Europe and the recent East Asian economic crisis. The growth rate of global primary energy use, however, has fallen from 2 per cent per year in the 1980s to about 1 per cent per year in the 1990s. This latter drop in growth rate is the result of regional differences in socio-economic development. First, the severe economic contraction of the transition economies in Eastern Europe and the former Soviet Union reduced their income by 40 per cent and primary energy use by 35 per cent between 1990 and 1998. Second, the rapid growth experienced by developing countries in the 1980s decreased in the early 1990s and slowed even more during the financial crisis of 1997-1998. Third, among the countries that are members of the Organisation for Economic Cooperation and Development (OECD), total energy use grew by 1.4 per cent per year.

4. The developing countries' share of global commercial energy use increased to almost 30 per cent in 1998 as compared to only 13 per cent in 1970. On a per capita basis, however, the increase in primary energy use has not resulted in more equitable access to energy services between industrialized and developing countries. In Africa, per capita energy use barely increased in the 1990s and remains at less than 10 per cent of average per capita use in North America. The same is true for a majority of countries in Asia, with the result that vast numbers of Africans and Asians have no access to commercial energy services and continue to rely on traditional biomass resources. Latin America saw little improvement, while China and especially Western Asia made above-average progress in providing access to modern energy services.

5. Regional energy use is even more inequitable when viewed in terms of per capita electricity use. There is a difference of two orders of magnitude between the least developed countries (83 kilowatt hours per capita) and the OECD average (8,053 kilowatt hours per capita).

6. In 1999, petroleum continued to be the world's dominant primary energy source, accounting for over 40 per cent of the total world commercial primary energy consumption of about 8,534 million metric tons of oil equivalent (Mtoe). Coal ranked second as a primary energy source in 1999, accounting for almost 25 per cent of world primary energy consumption. Dry natural gas ranked third as a primary energy source, accounting for about 24 per cent in 1999. Nuclear,

hydro and other (geothermal, solar and wind) electric power generation accounted for 7.6, 2.7 and 0.7 per cent, respectively.

7. During the period under consideration, of the increase in world primary commercial energy demand, about 75 per cent was met by oil and natural gas, 18 per cent by nuclear sources and 6 per cent by renewable sources, including hydropower. Coal consumption dropped during the period owing to declines in Eastern Europe and the former Soviet Union.

8. The large proportion of the growth in demand that came from oil and natural gas was due to price competitiveness and growth in supply capacity as well as the lack of competitive, non-petroleum alternatives for transportation fuels. The rapid increase in demand from the electric power sector, particularly in developing countries, and fuel-switching in electricity generation for reducing carbon emissions in industrialized countries, underpin the greatly expanded use of natural gas. Environmental considerations provided the major stimulus for increasing the use of natural gas in other sectors as well. The increase in electricity use has outpaced GDP growth in all regions, often by a large margin, reflecting the continued importance of electricity for economic development.

Energy trade patterns and globalization

9. The world energy system has become more integrated, as evidenced by the rising share of energy that crosses borders before reaching end-users. Energy trade has rebounded following the drop in oil prices in 1986 and, by the end of the last century, this share was approaching 55 per cent of primary energy use. Global energy trade remains dominated by crude oil and oil products. Despite the steady growth in coal trade and accelerated penetration of natural gas in the 1990s, the share of crude oil and oil products in trade only fell from 90 per cent in 1971 to 77 per cent in 1997. While expanded trade in coal, natural gas and even oil products was largely unaffected by world oil market prices, trade in crude oil definitely responds — though with a lag — to market price changes. In 1998, about 46 per cent of oil trade originated in the Middle East — up from 38 per cent a decade earlier. The low production cost in this region exposes investments in oil production capacity elsewhere to above-average risks.

10. For importing countries, concerns about oil import dependence and supply security appear to have given way somewhat to reliance on market forces and high expectations that new exploration and development will bring new oil to the market at a rate commensurate with demand. Moreover, as a result of globalization, the shift of oil from a strategic good to a commodity is accelerating, further lowering supply security concerns. In several countries, oil imports absorb a large share of export earnings. These countries benefited from the low oil market prices of the mid-1990s relative to the prices of 1985 (the year before the oil-price drop) and 1990 (when prices soared during the Gulf war).

11. Still, the world oil market remains fragile. As a result of strong world oil demand and production cuts in some producing countries, market prices nearly tripled within about a year (from $9.39 per barrel in December 1998 to $27.55 per barrel in March 2000 for API Gravity 2 oil).

Energy investments

12. Current energy investments amount to $290–430 billion per year (1.0-1.5 per cent of global GDP) and, if investments in end-use devices and appliances and energy efficiency improvements in buildings are included, capital requirements are doubled. Investments in renewable energy remain a small portion of the total investment in energy. Despite the energy sector reforms under way in many countries, the required levels of investments for sustained economic growth are not taking place in least developed countries particularly in Africa. Investments in electricity generating plants, refineries and energy-related infrastructure are long-term in nature and thus the equipment installed in the last 10 years will probably still be in operation in 2030 and beyond. The resulting overall shift to higher efficiency coal-fired and gas-fired electricity generating plants will be only gradual.

B. Main achievements

13. In the period under review, actions by Governments, international organizations, non-governmental organizations and the private sector have resulted in increased awareness of the lack of universal access to energy services, inequity in energy use, energy-related environmental degradation, the threat of

climate change, and unsustainable patterns of production and consumption. This increased awareness has contributed to a re-evaluation of energy use at the national and global levels.

14. One of the main results of this growing awareness of energy and environmental issues in the period following the United Nations Conference on Environment and Development has been an improvement in the efficiency with which energy is used in industry and power generation, as well as in lighting, household appliances, transportation, and heating and cooling of buildings brought about by policy measures and improved technology and management. This increasing efficiency in the uses of energy is a major factor contributing to the improvements in energy intensity (less energy input for the same product output) that have occurred historically in almost all OECD countries, and more recently in many transition economies, as well as some fast-growing developing countries such as Brazil and China. Demand-side management has gained momentum in many industrialized and developing countries with a positive impact on energy use. Barriers to the realization of greater end-use efficiency have been addressed through energy policies that use direct and indirect price mechanisms (such as the removal of subsidies and incorporation of externalities). Energy efficiency standards, appliance and product labelling, and voluntary agreements have made a considerable impact.

15. In support of the renewed interest in the development of renewable (solar, wind, biomass, small hydro and geothermal) sources of energy, many Governments have introduced national policies, including incentives, supported national programmes, developed institutional capabilities and adopted commercialization strategies, including innovative financing and credit mechanisms. The new renewable energies reached a 2 per cent share of world commercial energy consumption in 1998. Solar photovoltaic and grid-connected wind-installed capacities have been growing at the rate of 30 per cent per year. The efficiency of solar cells have shown steady improvement and costs of solar photovoltaic (PV) modules have come down by about 25 per cent during the period under review. Global shipments of PV modules have reached 200 MW per year. A total of 15 GW of wind electric capacity has been installed worldwide, much of this in the 1990s. New biomass technologies are gaining ground. Several countries have adopted legislative measures and introduced portfolio standards as well as non-fossil fuel obligations for electric utilities to promote renewable energy. Despite the large resource base and other environmental advantages of renewable energy, its growth is slow and its aggregate contribution to total energy output remains small.

16. Significant progress has been made in developing and applying advanced fossil fuel technologies to the long-term goal of near-zero emission of air pollutants, including greenhouse gases (GHGs). For power generation, advanced technologies are gradually replacing conventional ones. Despite public concerns in some countries about nuclear energy, several developing and industrialized countries are planning to increase its share in the energy mix. Natural-gas-fired combined cycles featuring low cost, high efficiency and low environmental impacts are being chosen wherever natural gas is readily available as a preferred option even over new large hydropower projects. Progress has been made in commercializing integrated coal gasification combined-cycle plants with air pollutant emissions nearly as low as those from natural gas combined-cycle systems. Prospects for early commercialization of distributed generation technologies, such as micro-turbines and fuel cells, have improved in the last decade through intensified research. Fuel cell applications for transport vehicles have also made significant advances. Work on supercritical and ultra-high-pressure boilers as well as polygeneration facilities, where electricity becomes a by-product of other value-added products, has opened up new opportunities.

17. During the period under review, one of the most significant developments has been the extent of deregulation and restructuring of energy markets, coupled with a strong trend toward regional integration and energy trade. Local and regional pollution, as well as GHG emissions, has received wide political attention, and the contribution of energy development to these problems, and to health and well-being in general, is under scrutiny. This has spurred initiatives to incorporate externalities in energy prices and also introduce levies such as the carbon tax. Decision makers have started to pay greater attention to energy prices as experience has shown that energy prices can influence consumer choices and behaviour and can affect economic development and growth.

C. Barriers

18. Policy, technical, institutional and financing barriers continue to hamper progress in sustainable energy development. Given the constraints on public financing of energy infrastructure, a substantial part of the investments will have to come from the private sector. The slow pace of policy and institutional reforms that are needed to create an enabling environment for private sector investments in energy has been a major barrier to investments.

19. Provision of modern energy services to vast populations in the rural areas of developing countries in an environmentally sound manner remains a major challenge. Among the many other challenges, access to energy and energy technologies, reduction of inequity, environmental protection, mobilization of financial resources and building institutional and human resources capacities in developing countries need particular attention.

20. Progress towards a sustainable energy future has lacked a sense of urgency, particularly in curbing GHG emissions from energy use. Moreover, there is no consistent trend with regard to the benefits and deficiencies of the liberalization of the energy sector in different countries.

21. Financial cooperation between industrialized and developing countries has not improved since 1992. If the anticipated growth rate of energy demand of 2.5 per cent per year in the developing countries and countries with transition economies is to materialize, investment requirements will be of the order of 2-2.5 per cent of their GDP. Considering that current energy investments amount to $290-430 billion per year (which will double if energy efficiency improvements across all sectors are included), mobilization of such large investments from domestic and foreign sources will be a major challenge. Lack of appropriate institutional tools to promote large-scale foreign direct investment is the main barrier in this regard.

III. Transport

A. Current situation

22. Transport is associated with emissions to the atmosphere with adverse effects to the environment at the global, regional and local levels. Its emissions include GHGs, most notably CO_2, which have adverse effects at the global level. It is also the source of emissions of particulate matter, lead, nitrogen oxides, sulfur oxides and volatile organic compounds, all of which have negative environmental and health impacts at the local and, often, at the regional levels. In addition, it is associated with adverse noise and land-use impacts. Moreover, accidents and congestion associated with unsustainable transport systems represent costs to society and thus adversely affect sustainable development.

23. The transport sector embodies all aspects of sustainable development — it has profound economic, social and environmental implications, and decisions at the local, national and international levels are important in overall sustainable development efforts and programmes. Investments made to meet growing transport demand are often long-term in nature, and decisions taken today will affect the prospects for achieving sustainable development in years to come.

B. Trends and achievements

24. The transport sector accounts for about 25 per cent of the total commercial energy consumed worldwide and consumes approximately one half of the total oil produced. Energy consumed by this sector increased by 2.3 per cent per year from 1990 to 1997, with oil accounting for 95 per cent of the total energy consumed. Consumption patterns in this sector are widely acknowledged to be unsustainable, and demand for transport services is expected to grow considerably as economic growth occurs in developing countries, incomes rise, the trend toward urbanization continues and the process of globalization moves forward with expected increases in world trade and personal travel. Between now and 2020, energy demand for transport is forecast to grow by 1.5 per cent per year in industrialized countries and by 3.6 per cent per year in developing countries.

25. Industrialized countries have well-developed transport systems and have made progress toward solving many problems associated with pollutants affecting the local environment as well as towards eliminating lead from gasoline. However, CO_2 emissions from transport remain a serious problem, and industrialized countries account for 57 per cent of global CO_2 emissions from transport, with 32 per cent from North America. In addition, per capita emissions

of CO_2 in aggregate and from transport are highest in OECD countries. Progress has been made in reducing localized emissions by, inter alia, implementing air quality and emissions standards, mandating the use of catalytic converters and introducing cleaner fuels. Furthermore, the use of public transport, including rail systems, in urban areas and for inter-city travel has been actively encouraged in some countries, and non-motorized transport has been promoted by incorporating walking trails and bike paths in urban plans. Moreover, many OECD countries are implementing agreements to control cross-boundary emissions. OECD recently developed an innovative sustainable transport strategy to achieve sustainable transport within one generation.

26. In developing countries increases in per capita income and growth in population have contributed to the rising demand for transportation services and associated energy. Economic growth in developing countries has often been marked by improvements in physical infrastructure during the past 25 years, including transportation systems. Some developing countries now boast modern road and air transport facilities, while many have modern ports and improved sea access. Also, there has been some focus on urban transport problems since congestion and poor air quality have adversely affected local populations. The United Nations and the World Bank have jointly initiated the Global Initiative on Transport Emissions (GITE) to promote private-public partnerships as a means of improving the knowledge base and fostering the transfer of cleaner vehicle and fuel technologies.

27. Air transport is also expected to increase significantly. Aircraft-produced emissions are similar to other fossil fuel vehicles but are unusual in that a significant proportion of the emissions occur at very high altitudes. At the global level, it is estimated that aircraft GHG emissions contribute about 3.5 per cent of the total radiative forcing[2] by all human activities and that this proportion is likely to increase. Emissions from aircraft relevant to climate change include CO_2, water vapour, NOx, SOx and soot. These gases and particulates are emitted directly into the upper troposphere and lower stratosphere, where they contribute to the concentration of GHGs. Investigations have been initiated by the International Civil Aviation Organization on economic incentives and other possible means for reducing emissions from air transport.

C. Barriers

28. Barriers to overcome in achieving sustainable transport encompass a wide array of technical, institutional, financial and behavioural characteristics and conditions that are often firmly entrenched in current economic and social systems throughout the world. The reliance on private vehicles provides an excellent example of the barriers existing in many countries. A preference for private vehicles has been reinforced by public spending on highway systems and funding mechanisms that favour highway expansion and urban sprawl in some countries, coupled with benign neglect and inadequate funding of mass transit systems that would provide alternatives for users. In many countries today, life styles dependent upon private vehicles will be difficult to change, and the focus has been on improving technologies and standards. Innovative ways to influence transport behaviour patterns need to be examined and tried.

29. For developing countries the provision of transport services remains a serious development problem and securing financing remains a serious barrier. Furthermore, developing countries are hampered by inadequate institutions to regulate and control emissions, introduce fuel and vehicle standards, initiate inspection and maintenance programmes, and take transport needs into account in urban and rural planning. Barriers to the transfer of cleaner technology remains a problem for many countries, and impediments to the upgrading of vehicle fleets need to be overcome. In addition, the improvement of often deteriorated mass transit systems requires substantial financial capital in many countries.

IV. Issues for further consideration

30. There is a pronounced need not only to continue ongoing efforts to curb GHG and other polluting emissions, but also to expand them greatly, so as to close the ever-widening gap between what has been done and what is realistically needed to mitigate this and other serious environmental impacts related to energy production and use.

31. By using resources and technical options that rely on a combination of higher energy efficiency, renewable resources and advanced energy technologies, paths to energy development can be found that address all aspects of the goals of

sustainable development. Appropriate national policies and strategies as well as international cooperation are key to achieving the intended objectives.

32. In addition to the need to orient national energy policies to the economic, social and environmental goals of sustainable development, there are a host of issues that still need to be dealt with at the national level. Dominant among these issues are the need to ensure equitable access to modern energy services; create an enabling environment and regulations that will permit markets to work better; develop a diversity of locally available energy resources; and electrify rural areas through grid extension or decentralized options.

33. At the regional and international levels, the main issues are strengthening regional and international cooperation for energy security and market stability; transferring energy efficient, renewable energy and cleaner advanced fossil-fuel technologies to developing nations; building institutional and human resource capacities; and mobilizing financial resources in support of national efforts.

34. Economic growth, globalization and the expected associated increases in world trade and personal travel will pose a formidable challenge for the transport sector as it attempts to reduce CO_2 emissions without adversely affecting the provision of services. Regional cooperation for controlling cross-boundary pollution from the transport sector will become increasingly necessary as demand for transport services rises. The transport of toxic and radioactive materials, as well as attention to the problem of oil spills by oil tankers and leakages of natural gas pipelines, will continue to merit the attention of the international community and will remain an area of consideration at the regional and national levels.

35. Meeting the challenges posed by the transport sector calls for a focus on both technological innovation and influencing travel behaviour patterns in both industrialized and developing countries. There have been notable advances and technological improvements in engines and vehicles and in producing cleaner fuels. Alternative fuel vehicles are being tested in the private sector, including promising fuel-cell and hybrid vehicles.

36. Future efforts to influence travel behaviour patterns might focus on fiscal policy (taxes and subsidies), schemes to base vehicle use on cost per trip, and improvement of mass transport systems, including rail systems, which in many developing countries are overburdened and unable to meet operating costs. Privatization programmes may be effective in this regard.

37. In developing countries, the challenges include rural and urban planning, zoning that has a positive effect on transport patterns, and investment decisions that are undertaken with sustainable development in mind. Implementing effective inspection and maintenance programmes is also important, since vehicle life is relatively long and older vehicles are associated with higher emissions.

38. Many rural areas of developing countries suffer from a lack of adequate transport systems, in some areas relying totally on animal power and walking, and the provision of services remains a challenge.

39. Concerted efforts must be made to eliminate the use of leaded gasoline.

Notes

[1] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

[2] Radiative forcing is a measure of the importance of a potential climate change mechanism.

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Sustainable development of tourism*

Report of the Secretary-General

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* The present report was prepared by the World Tourism Organization as task manager for the area of sustainable development of tourism, with contributions from other United Nations agencies and international organizations. The report is a brief factual overview, which intends to inform the Commission on Sustainable Development on key developments in the subject area.

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Introduction

1. While tourism was not the subject of a chapter in Agenda 21,[1] the Programme for the Further Implementation of Agenda 21,[2] adopted by the General Assembly at its nineteenth special session in 1997, included sustainable tourism as one of its sectoral themes. The Programme recognized that tourism was one of the largest industries in the world and one of the fastest growing economic sectors.[3] It noted that the expected growth in the tourism sector and the increasing reliance of many developing countries, including small island developing States, on that sector as a major employer and contributor to the economy highlighted the need to pay special attention to the relationship between environmental conservation and protection and sustainable tourism. The present report examines trends and developments in sustainable tourism and identifies issues for future consideration.

I. Trends in tourism

2. Tourism has been one of the major economic and social phenomena of the twentieth century. From an activity enjoyed by only a small group of relatively well-off people at the beginning of the century, it had become a mass phenomenon in the more developed countries by the 1970s and has now reached wider groups of people in most nations.

3. In 1999, the number of international tourist arrivals reached 664 million, while receipts from international tourism were $455 billion. During the 1990s, international arrivals grew at an average annual rate of 4.2 per cent, while international tourism receipts, at current prices and excluding international transport costs, had an average annual growth rate of 7.3 per cent. Domestic tourist movements are much higher than international tourist arrivals, though more difficult to quantify.

4. Tourism, a sector that integrates a wide range of economic activities, is now regarded as the world's largest industry. In 1998, 7.9 per cent of the worldwide export value of goods and services came from tourism, surpassing such leading industries as automotive products and chemicals. Tourism is already the largest sector of international trade in services. For many nations, in particular most small island developing States, but also some bigger and more economically diversified countries, tourism has become the main sector of economic activity, or at least the main source of foreign exchange earnings, and in most countries it is an important source of employment.

5. In addition to strong overall expansion, the development of tourism is characterized by continuing geographical spread and diversification of tourist destinations. While in 1950 the top 15 tourist destinations, all in Western Europe and North America, attracted 97 per cent of the world's total arrivals, by 1999 this figure had fallen to 62 per cent, with market shares increasing for developing countries and economies in transition, particularly in South-East Asia, Central and Eastern Europe, and Latin America. Africa, with the exception of a few countries in North Africa, remains a less visited destination, with only 2.5 per cent of total international arrivals.

6. Some key qualitative development trends in tourism include: increased market segmentation; development of new forms of tourism, especially those related to nature, wildlife, rural areas and culture; and introduction of new programmes in traditional package tours. Consumers' motivations and behaviour are increasingly characterized by a more selective choice of destination, greater attention to the tourism experience and its quality, and a greater sensitivity to the environment, traditional culture and local people at the destinations.

II. Incorporation of sustainability in tourism development

7. As a result of the rapid expansion of the tourism sector, traditional and emerging tourism destinations are facing increasing pressure on their natural, cultural and socio-economic environments. There is now a recognition that uncontrolled growth in tourism aiming at short-term benefits often results in negative impacts, harming the environment and societies, and destroying the very basis on which tourism is built and thrives.

8. Even before the 1990s, some negative impacts of tourism were addressed by some Governments and international organizations, including precarious conditions of employment, child exploitation and prostitution, degeneration of traditions and cultural values, and environmental damage to tourist sites and natural settings. Such adverse environmental impacts are caused by over-consumption of resources, pollution

and waste generated by development of tourism infrastructure and facilities, transportation, and tourist activities themselves. It was also recognized that tourism had the potential to bring economic benefits to host communities and serve as a tool for poverty alleviation, conservation of natural and cultural assets and other benefits, provided it was properly planned and managed with a long-term vision.

9. The principle of sustainable tourism was proposed as early as 1988 by the World Tourism Organization, with sustainable tourism "envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems".

10. Host societies have become progressively aware of the problems of unsustainable tourism, and sustainability concerns are increasingly being addressed in national, regional and local tourism policies, strategies and plans. In addition, some tourists are now demanding higher environmental standards from tourist services, as well as a greater commitment to local communities and economies.

11. Although tourism was not included in Agenda 21, the recognition of the importance of sustainability in tourism by the key stakeholders, including Governments, international organizations, non-governmental organizations and the international tourism private sector, resulted in the formulation of Agenda 21 for the Travel and Tourism Industry[4] in 1995. Many tourism-based communities have formulated their own Agenda 21s at the local level.

12. A multi-stakeholder Working Group on Tourism was called for by the Commission on Sustainable Development at its seventh session.[5] The Working Group was tasked with coordinating the implementation of the international work programme on sustainable tourism development adopted by the seventh session of CSD. This Working Group is an innovative mechanism for collaborative efforts by major groups, Governments and international organizations to enable sustainable tourism development. The first meeting of the Working Group was convened by the World Tourism Organization in Costa Rica (January 2000), where members identified 11 priority issues covering a wide variety of aspects of sustainable tourism development. Further progress has been slow owing to lack of funding.

13. There has been gradual but increasingly widespread application of environmental management techniques in tourism companies and establishments, in particular hotels. There has also been increasing use and popularity of voluntary approaches such as certification systems, eco-labels, environmental awards and codes of conduct. The Global Code of Ethics for Tourism was introduced by the World Tourism Organization in 1999 following over two years of consultation with the industry and was approved by the member States of the World Tourism Organization. It has been submitted to the Economic and Social Council for consideration at its substantive session of 2001 (see E/2001/3).

14. A set of sustainability indicators on tourism has been developed and tested in a number of countries under the initiative of the World Tourism Organization.[6] These indicators are now beginning to be used at some destinations. Further work is required to improve existing know-how and methodologies for the definition, adaptation and application of indicators to monitor the social, economic and environmental impacts of tourism. Further work is also required to apply indicators in a larger number of countries.

15. Many tourist destinations are in mountain and coastal regions in different climate zones from those of tourists' home countries. Tourists are therefore less familiar with natural disasters in those areas, for example, avalanches in ski resorts, hurricanes in the Caribbean islands and temperature extremes causing sunstroke or frostbite. It is important that tourism development in such areas include public information, monitoring and forecasting with respect to such emergencies.

16. Ecotourism is a small but rapidly growing niche market. Ecotourism activities have been expanding rapidly over the past two decades worldwide and further growth is expected in the future. Ecotourism generally involves travel by small groups to natural areas with the main motivation being the observation and appreciation of nature, and includes educational information on local ecosystems, cultures and sustainability issues. It also attempts to minimize negative impacts upon the nature and sociocultural environment. As one of the tools to control and manage ecotourism activities, it often involves fees for entry to

protected natural areas, with at least part of the fees dedicated to the conservation of the area. The International Year of Ecotourism in 2002 will offer an opportunity to review ecotourism experiences worldwide, in order to consolidate tools and institutional frameworks that ensure its sustainable development in the future.

III. Issues for further consideration

17. Tourism is expected to continue to grow in the future owing to population growth, improved living standards, improvement and expansion of transportation systems, increasing free time and other factors. According to forecasts by the World Tourism Organization, international tourist arrivals are likely to almost triple over the next two decades, with nearly 1.6 billion tourists visiting foreign countries by the year 2020. This will further increase the pressure on the natural, cultural and socio-economic environments of popular destinations. More intensified efforts to address sustainability in tourism development are required.

18. Along with tourism in general, ecotourism and other forms of environmentally friendly tourism are expected to continue growing rapidly. This will also require specific planning, management and infrastructure to protect the natural sites of interest, which are often ecologically fragile. Availability of finance and capacity-building may hold a key to the sustainable development of this subsector.

19. Small island developing States face particular challenges. Tourism is often seen as a promising growth sector in countries with a natural environment appealing to tourists, especially in view of the constraints that those countries may face in respect of developing alternative sources of foreign exchange through exports. However, rapid development of tourism can cause significant social disruptions and increase environmental and ecological pressures. The fragile ecosystems of small island States, and their generally more limited scope for pursuing alternative development strategies, make concerns for the environmental and ecological impact of tourism particularly acute. Integrated and environmentally and culturally conscious tourism planning should be developed to make tourism compatible with the conservation of major ecosystems and with the preservation of the historical-cultural heritage.

Notes

[1] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

[2] General Assembly resolution S-19/2, annex.

[3] Ibid., para. 67.

[4] Prepared jointly by the World Tourism Organization, the World Travel and Tourism Council and the Earth Council.

[5] See *Official Records of the Economic and Social Council, 1999, Supplement No. 9* (E/1999/29), chap. I, sect. C, decision 7/3, para. 10.

[6] See *A Practical Guide for the Development and Application of Indicators of Sustainable Tourism* (World Tourism Organization, 1996).